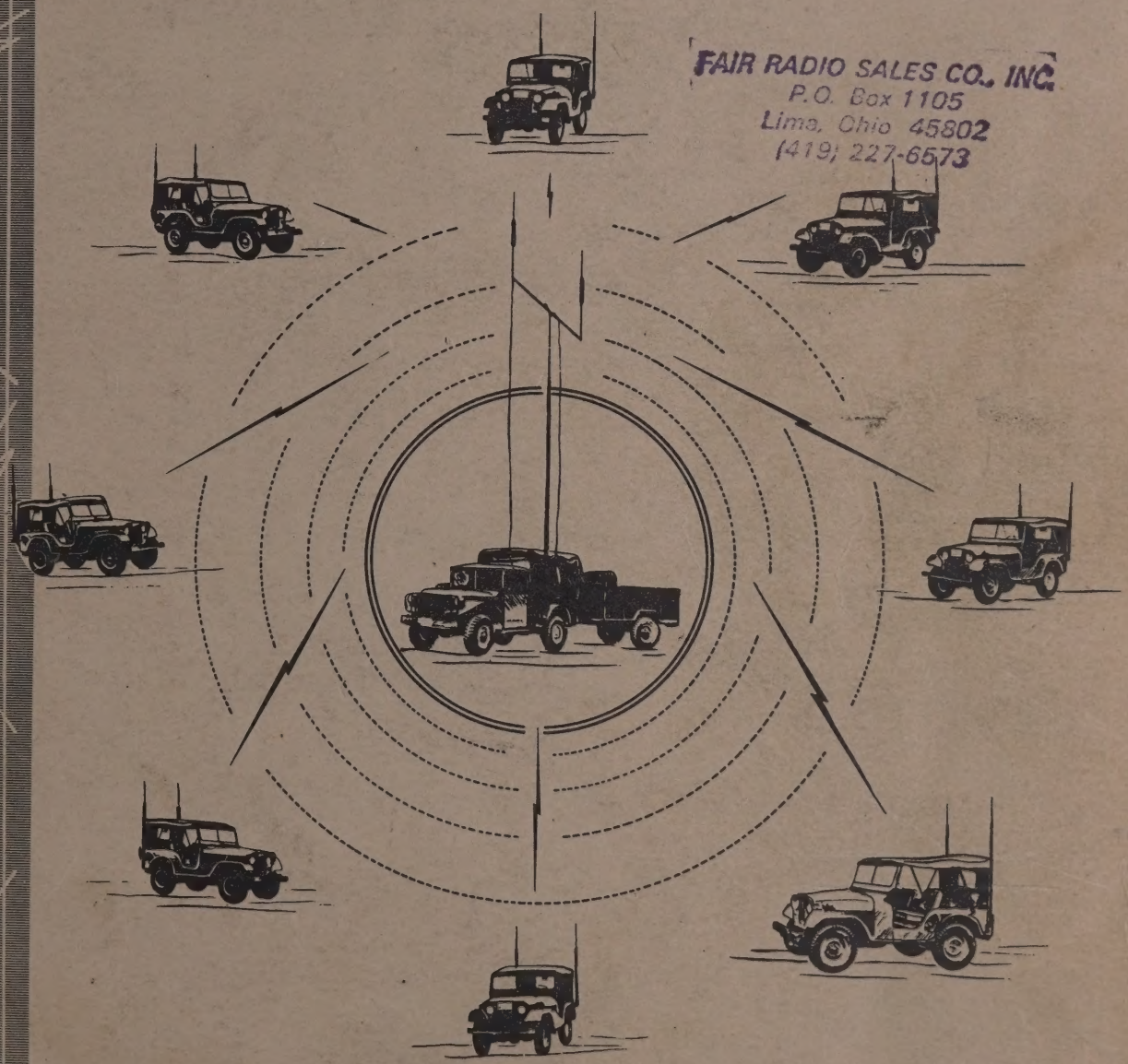
AN/MRC-66....

Communication Central

SUBSCRIBER EQUIPMENT

FAIR RADIO SALES CO., INC.
P.O. Box 1105
Lima, Ohio 45802
(419) 227-6573



MOTOROLA INC.
WESTERN MILITARY ELECTRONICS CENTER

schematics pages
27, 30, 33, 36, 41, 44
48, 51, 54, 56, 58, 62

COMMUNICATION CENTRAL
AN/MRC-66( )
(SUBSCRIBER EQUIPMENT)

DRIVER pg 48

BOOK 1 OF 2 SEPTEMBER 1,1957

CONTRACT NO. DA36-039 SC-72346

MOTOROLA INC.
WESTERN MILITARY ELECTRONICS CENTER

2000 VOLTS

WARNING

HIGH VOLTAGE
IS USED IN THE OPERATION
OF THIS EQUIPMENT

DEATH ON CONTACT
MAY RESULT IF OPERATING PERSONNEL
FAIL TO OBSERVE SAFETY PRECAUTIONS

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2000 VOLTS

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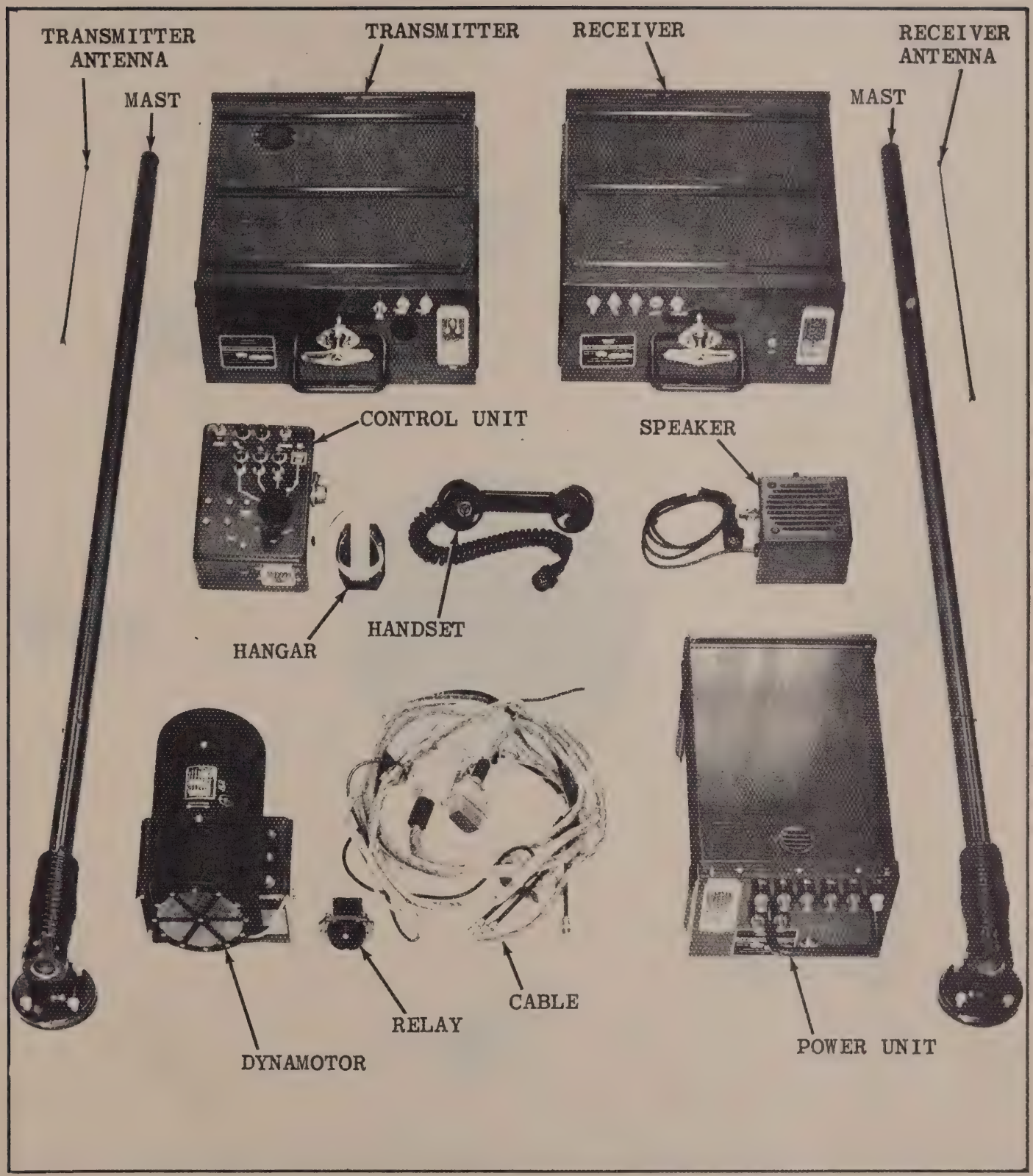


FIGURE 1.1. SUBSCRIBER EQUIPMENT

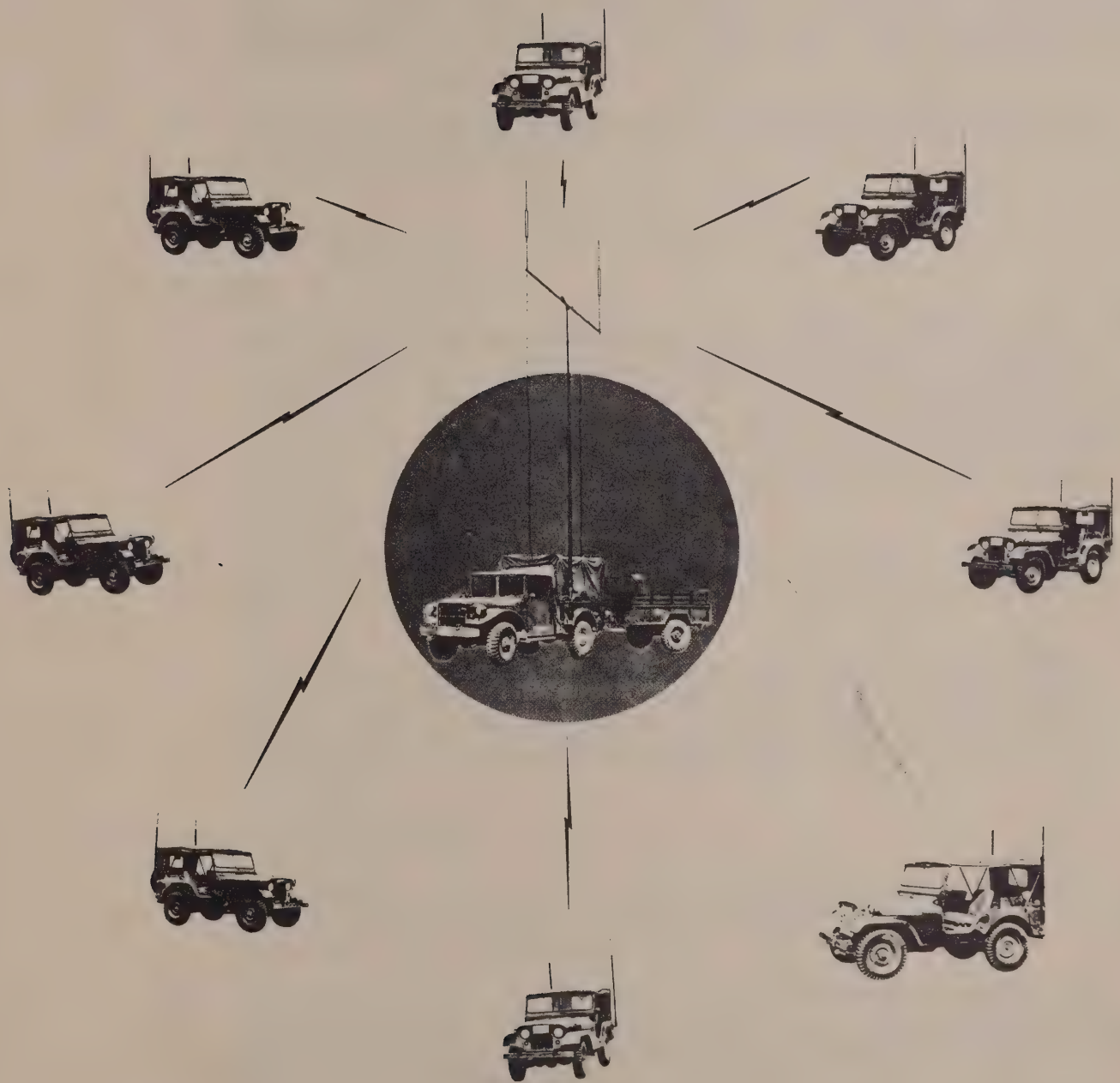


FIGURE 1.2 SYSTEM APPLICATION, AN/MRC-66 ( )

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

   a. This technical manual contains instructions for the operation and maintenance of the Subscriber equipment, Communication Central AN/MRC-66 ( ), (Figure 1.1). The information is intended for operators, and maintenance personnel of engineering level.

   b. The Subscriber equipment is designed to operate with a Central equipment which is described in Book Two.

Section II. DESCRIPTION AND DATA

2. Purpose of equipment

   a. The purpose of the COMMUNICATION CENTRAL AN/MRC-66 ( ) is to provide a switched telephone service via Radio circuits. The objective is to furnish essentially the same type of telephone service that is normally provided with wire lines but to provide it to subscribers that are mobile and cannot be served with wire lines. See figure 1.2.

   b. The SUBSCRIBER equipment described in this manual will be installed in Jeeps or other mobile ground transportation.

   c. Two common and one conference channels are provided for each subscriber. Each channel is arranged in a Party Line system. Call signals are provided for station selection and Busy lamps designate clear or busy channels.

3. System Application

   a. A system consists of sixteen Subscriber stations and one Central station. A representative display of a portion of this network is shown in Figure 1.2.

   b. Each Subscriber has a MAIN and ALTERNATE channel for operation into the Central station. Subscribers operate through the Central station switchboard to communicate with other Subscribers.

   c. Full duplex operation is provided, also call and busy signalling.

d. A NET position is provided also to permit the Subscriber stations to communicate directly with each other. In the event of failure of a Central station, use of the NET position would continue the Subscriber communication facilities. The NET position is simplex operation and the "Push-to-Talk" switch must be used.

4. Technical Characteristics

Type of transmissions and reception.	Voice, calling and busy signalling.
Frequency range.	Semi-fixed V.H.F.
Operational facilities	Full duplex, Monitoring, Call and busy signalling, Two, party line channels One, netting channel One CONF channel
Type of tuning	Pre-set
Communication range	10 miles over average terrain
Total power drain	30 amperes at 28 volts D.C.

5. List of Components for One Subscriber Station.

a. 1. Mounting Rack
1. Transmitter Cabinet
1. Receiver Cabinet
1. Power Supply Unit
1. Control Unit
2. Antennas
1. Handset and Hanger Switch
1. Speaker
1. Headset
1. Microphone
Cables
Running Spares
Miscellaneous

6. Additional Equipment Required

a. 1. Jeep E/W Generator Modification Kit.

7. General System Description

a. The sixteen subscriber stations in this system are standardized. The voice frequency channels, busy, and ringing tones have been pre-set in each subscriber station. For details of Frequency Allocation see Figure 1.3. For Subscriber Channel and Vibrasponder assignments see Figure 1.4. Two complete systems are provided.

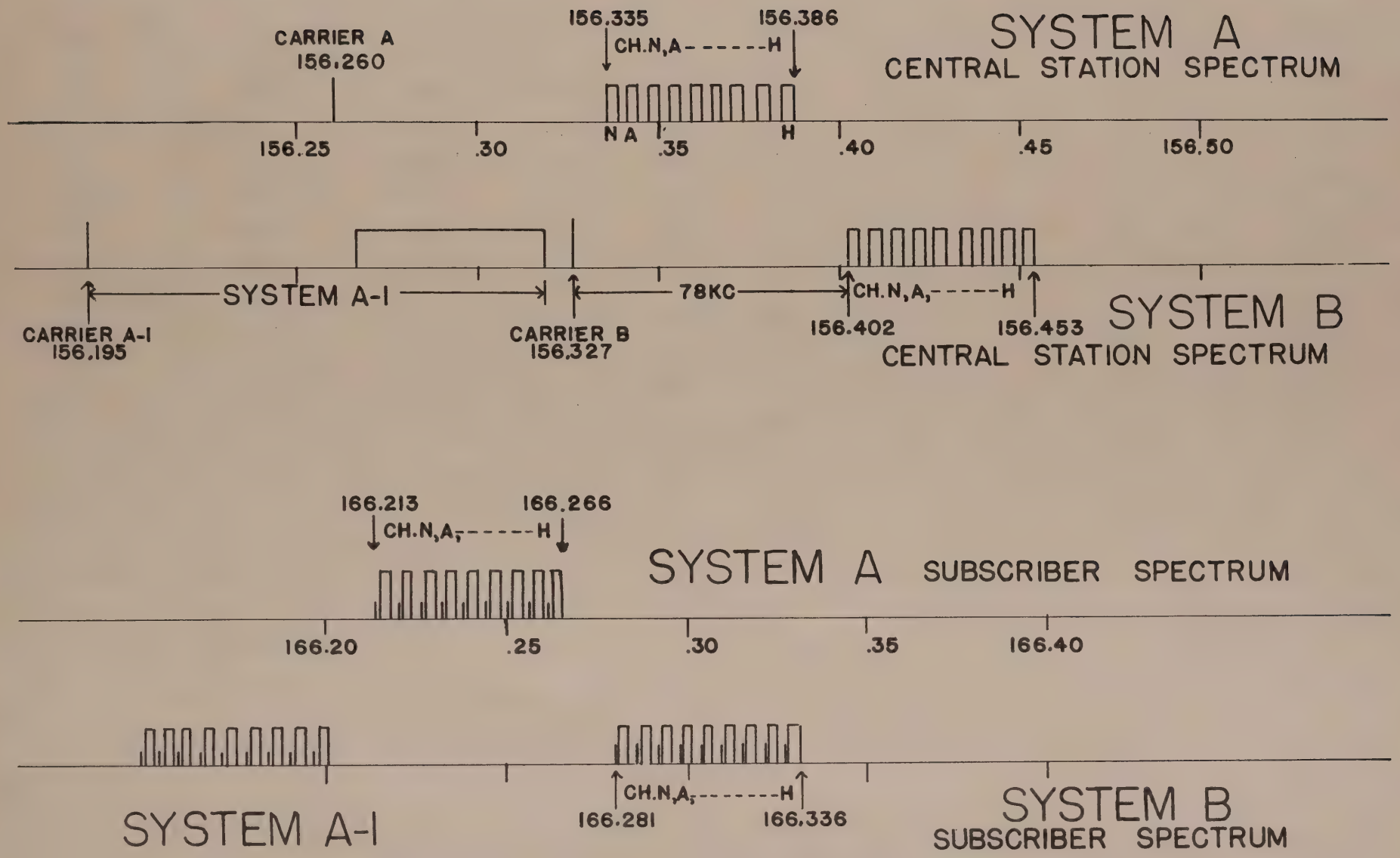
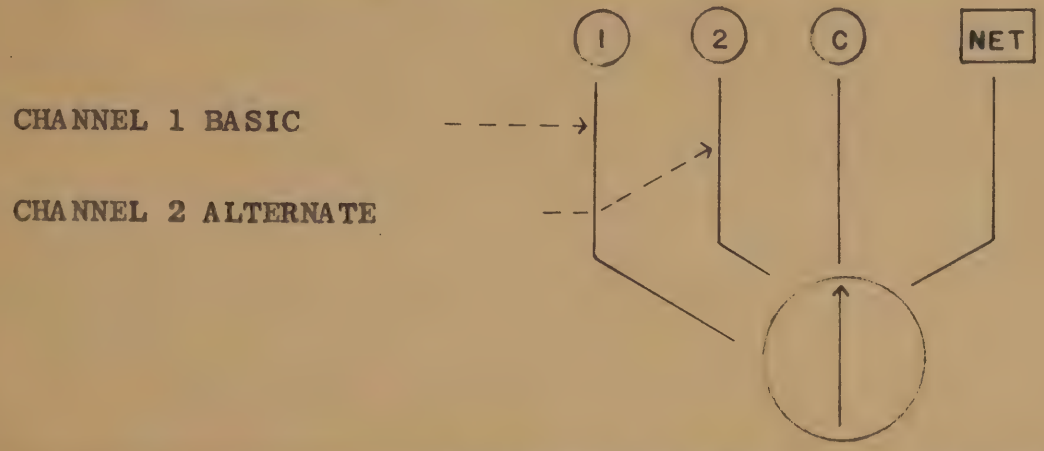


FIGURE 1.3 COMMUNICATION CENTRAL FREQUENCY ASSIGNMENT

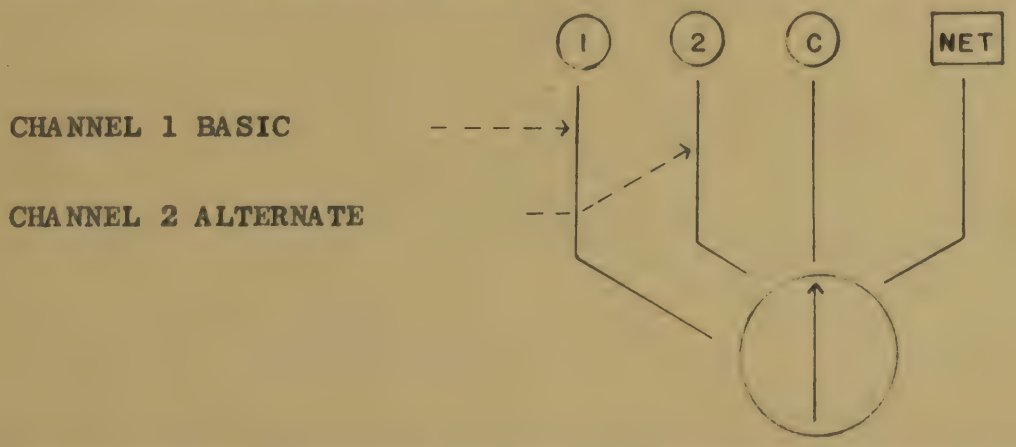
21	C	356kc	D	350kc	N 374kc	881.0	794.3	473.2	136.5	123.0
22	C	356kc	D	350kc	N 374kc	881.0	794.3	473.2	136.5	151.4
23	D	350kc	E	344kc	N 374kc	794.3	716.1	473.2	136.5	167.9
24	D	350kc	E	344kc	N 374kc	794.3	716.1	473.2	136.5	186.2
25	E	344kc	F	338kc	N 374kc	716.1	645.7	473.2	151.4	100.0
26	E	344kc	F	338kc	N 374kc	716.1	645.7	473.2	151.4	110.9
27	F	338kc	G	332kc	N 374kc	645.7	582.1	473.2	151.4	123.0
28	F	338kc	G	332kc	N 374kc	645.7	582.1	473.2	151.4	136.5
29	G	332kc	H	326kc	N 374kc	582.1	524.8	473.2	151.4	167.9
30	G	332kc	H	326kc	N 374kc	582.1	524.8	473.2	151.4	186.2
31	H	326kc	A	368kc	N 374kc	524.8	1084.0	473.2	167.9	100
32	H	326kc	A	368kc	N 374kc	528.8	1084.0	473.2	167.9	110.9



SUBSCRIBER CHANNEL AND VIBRASPONDER ASSIGNMENTS

FIGURE 1.4

SUBSCRIBER NUMBER	CHANNEL 1 LINE	XTAL	CHANNEL 2 LINE	XTAL	CONFERENCE LINE	XTAL	BUSY TONE VIBRASPONDER-DECODER Z3	Z4	Z5	CALL TONE VIBRASPONDER-DECODER Z2	Z1
1	A	368Kc	B	362Kc	N	374Kc	1084	977.2	473.2	100	110.9
2	A	368Kc	B	362kc	N	374kc	1084	977.2	473.2	100	123.0
3	B	362kc	C	356kc	N	374kc	977.2	881.0	473.2	100	136.5
4	B	362kc	C	356kc	N	374kc	977.2	881.0	473.2	100	151.4
5	C	356kc	D	350kc	N	374kc	881.0	794.3	473.2	100	167.9
6	C	356kc	D	350kc	N	374kc	881.0	794.3	473.2	100	186.2
7	D	350kc	E	344kc	N	374kc	794.3	716.1	473.2	110.9	100
8	D	350kc	E	344kc	N	374kc	794.3	716.1	473.2	110.9	123.0
9	E	344kc	F	338kc	N	374kc	716.1	645.7	473.2	110.9	136.5
10	E	344kc	F	338kc	N	374kc	716.1	645.7	473.2	110.9	151.4
11	F	338kc	G	332kc	N	374kc	645.7	582.1	473.2	110.9	167.9
12	F	338kc	G	332kc	N	374kc	645.7	582.1	473.2	110.9	186.2
13	G	332kc	H	326kc	N	374kc	582.1	524.8	473.2	123.0	100.0
14	G	332kc	H	326kc	N	374kc	582.1	524.8	473.2	123.0	110.9
15	H	326kc	A	368kc	N	374kc	524.8	1084.0	473.2	123.0	136.5
16	H	326kc	A	368kc	N	374kc	524.8	1084.0	473.2	123.0	151.4
17	A	368kc	B	362kc	N	374kc	1084.0	977.2	473.2	123.0	167.9
18	A	368kc	B	362kc	N	374kc	1084.0	977.2	473.2	123.0	186.2
19	B	362kc	C	356kc	N	374kc	977.2	881.0	473.2	136.5	100.0
20	B	362kc	C	356kc	N	374kc	977.2	881.0	473.2	136.5	110.9
21	C	356kc	D	350kc	N	374kc	881.0	794.3	473.2	136.5	123.0
22	C	356kc	D	350kc	N	374kc	881.0	794.3	473.2	136.5	151.4
23	D	350kc	E	344kc	N	374kc	794.3	716.1	473.2	136.5	167.9
24	D	350kc	E	344kc	N	374kc	794.3	716.1	473.2	136.5	186.2
25	E	344kc	F	338kc	N	374kc	716.1	645.7	473.2	151.4	100.0
26	E	344kc	F	338kc	N	374kc	716.1	645.7	473.2	151.4	110.9
27	F	338kc	G	332kc	N	374kc	645.7	582.1	473.2	151.4	123.0
28	F	338kc	G	332kc	N	374kc	645.7	582.1	473.2	151.4	136.5
29	G	332kc	H	326kc	N	374kc	582.1	524.8	473.2	151.4	167.9
30	G	332kc	H	326kc	N	374kc	582.1	524.8	473.2	151.4	186.2
31	H	326kc	A	368kc	N	374kc	524.8	1084.0	473.2	167.9	100
32	H	326kc	A	368kc	N	374kc	528.8	1084.0	473.2	167.9	110.9



SUBSCRIBER CHANNEL AND VIBRASPONDER ASSIGNMENTS

FIGURE 1.4

b. By the use of Single Sideband techniques and channel allocation, several subscribers may talk simultaneously without cross-talk.

8. Receiver Unit

a. The Subscriber receivers are very similar in structure, function, and detailed circuit and mechanical arrangement. They differ from each other only in their operating channel frequencies and in those components which determine the channel frequencies.

b. Receiver characteristics pertinent to system operation are displayed in Figures 1.3 and 1.4.

c. Detailed information of the receivers is displayed in the Maintenance Section of this handbook.

9. Transmitter Unit

a. The Subscriber transmitters are identical in structure, function, and detailed circuit and mechanical arrangement. Channel selection is provided by the use of oscillator signals developed in the receiver.

b. The channel selector switch on the Control Unit selects the recevier channel and the corresponding channel oscillator signal to the transmitter.

c. Detailed information of the transmitters is displayed in the Maintenance section of this handbook.

10. Control Unit.

a. The Control Unit, with the associated hanger switch, is mounted on the instrument panel of the Jeep. This unit provides all of the required operating controls for the subscriber equipment.

b. Electrically, this unit is the control and switching unit for the audio, and Call signalling, Figure 1.5. The hanger switch provides the transmitter ON-OFF switching and channel busy tone signalling.

11. Power Supply Unit.

a. The Power Supply Unit in association with the Dynamotor Unit supplies the operating voltages for the transmitter and receiver.

b. The Dynamotor operates from a 28V 30A DC source to provide voltages for the transmitter and receiver power supplies. The two power supplies are encased in the Power Supply cabinet.

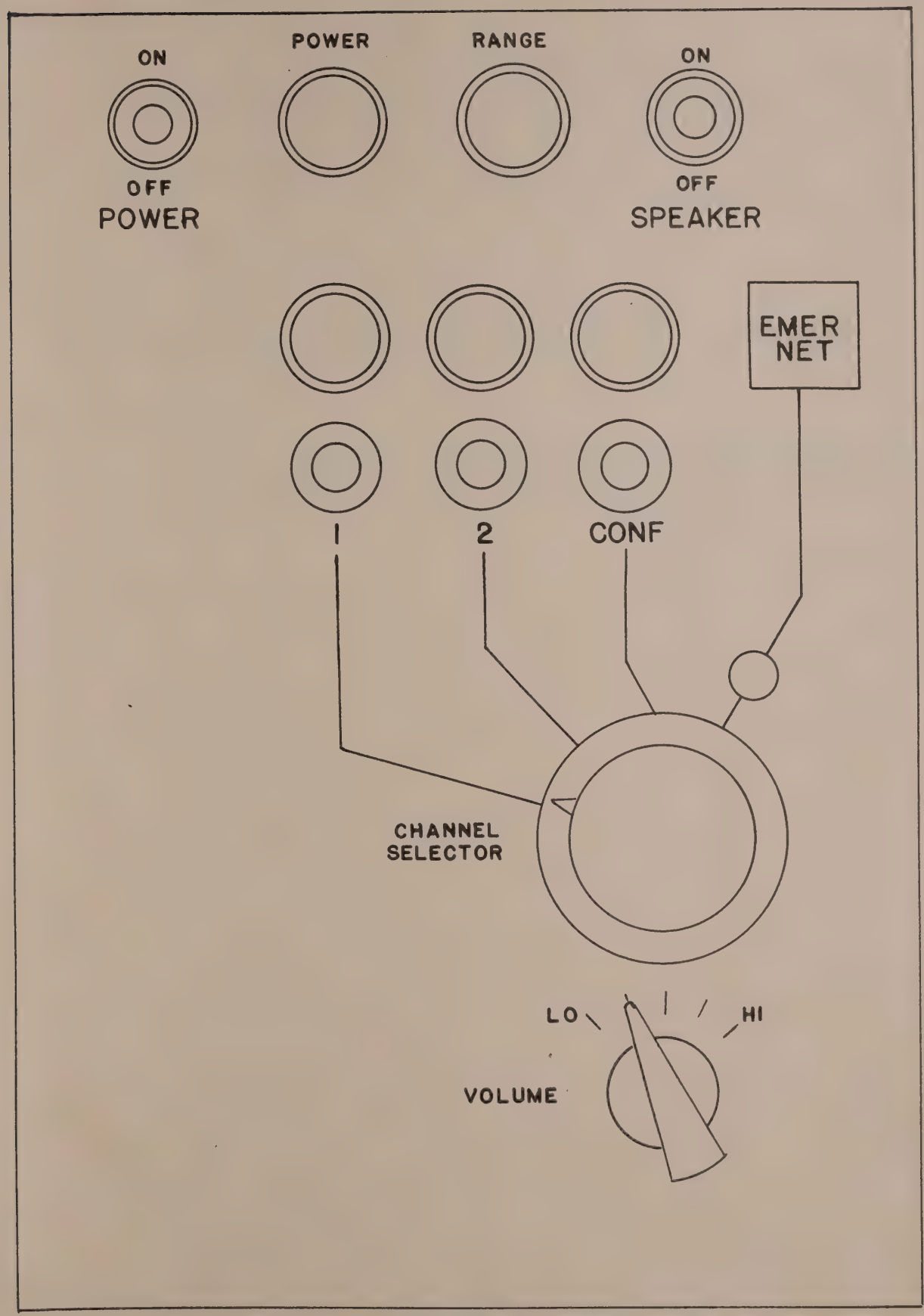


FIGURE 1.5 SUBSCRIBER CONTROL UNIT

12. Handset, Headset and Speaker

a. This equipment is designed primarily for the use of a standard type handset. Provisions are made for the use of a headset or speaker, and a separate microphone.

13. Antennas, Receiving and Transmitting

a. Separate antennas are used on the receiver and transmitter.

14. Miscellaneous Equipments

a. Miscellaneous equipments consist of: cables, wire, hardware, etc.

15. Running Spares

a. The spare parts provided for each of these components are identical. A list of the Running Spares provided will be found in the back of this manual.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. MODES OF OPERATION

16. Monitoring

a. The operator of any subscriber station can monitor one side only of the conversation on a busy channel. Setting the selector switch to a busy channel will permit the operator to monitor the conversation from the central station.

17. Calling

a. The calling operator selects a clear channel, rotates the selector switch to that channel, then picks up the handset. This series of operations causes the associated busy lamp to be illuminated. In the Central station, a drop and a buzzer are actuated, alerting the central operator.

18. Answering a call

a. An incoming call is indicated by a flashing Busy Lamp on the subscriber control unit and followed by a buzzer signal. (The flashing lamp by itself does not constitute a call).

b. The operator receiving the flashing lamp and buzzer signals rotates the selector switch to the indicated channel and lifts the handset off the hook. These operations bring the busy lamp to a steady illuminated condition and the operator can converse with the calling party.

19. Busy Signalling

a. Busy signalling switches are located immediately below the busy lamps. (See Figure 1.5)

b. The subscriber operator receiving a call which cannot be answered immediately, can notify the calling operator by momentarily pressing the busy signal switch associated with the channel calling.

20. Duplex Operation

a. Full duplex operation is provided on the (1) main and (2) auxiliary channels.

b. Duplex operation is not provided on the Conference and Net channels. The "push-to-talk" switch must be used on these channels.

Section II. CONTROLS AND INSTRUMENTS

21. General

a. All of the normal operational controls are located on the Control Unit and associated Hanger Switch.

b. The controls associated with frequency injection level, etc. are located in the cabinets. These controls are pre-set and require no manipulation by the operator.

22. Control Unit

a. The following controls and indicators are contained in the Control Unit.

(1) POWER ON/OFF switch and associated lamp (green) which is illuminated when the power is ON.

(2) RANGE lamp (red) becomes illuminated when the Subscriber station is out of range of the Central station.

(3) SPEAKER ON/OFF switch transfers the voice signals from the handset to the speaker, in the ON position.

(4) The 1, 2, and CONF lamps (amber) are the Call/Busy lamps for the primary, alternate and conference channels. They flash when a call is in progress and become a steady glow while the channel is busy.

(5) The 1, 2, and CONF push-button switches are the, "I am busy", signalling switches. They are used to signal the Central operator when the Subscriber is busy on another channel.

(6) CHANNEL SELECTOR switch provides the operator with selection of the 1 (main) 2 (alternate), CONF, and EMERGENCY NET channels. The push-button associated with the EMERGENCY NET Channel must be pressed to permit the selector switch to be rotated to this position.

(7) VOLUME switch is provided to control the volume level to the handset or speaker. Volume is increased in a clockwise direction.

(8) A buzzer is contained in the Control Unit for Call signalling.

b. The associated Hanger Switch (figure 4.15A) contains the transmitter on-off switch. This switch is automatically actuated when the handset is lifted from the hook.

Section III. OPERATION

23. Operational Procedures

a. Operation of the subscriber sets involves the following procedures:

(1) Operation of the POWER ON-OFF switch to ON position.

(2) Operation of SPEAKER switch to ON (speaker) or OFF (handset) position.

(3) Rotate CHANNEL switch to desired channel.

(4) Rotate VOLUME switch to desired level.

(5) Lift handset (or microphone) from hanger switch.

(6) Give Central operator the name of desired station. (Path of operation is displayed in figure 2.1).

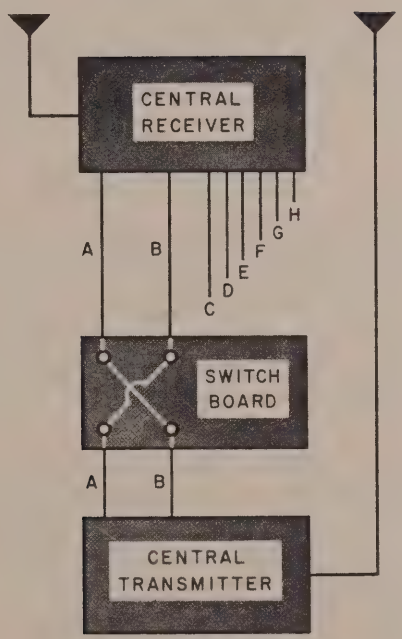
(7) When conversation is finished, return handset to hanger. (Seat firmly).

(8) Selection of the CONF or NET channels requires use of the Press-to-talk switch.

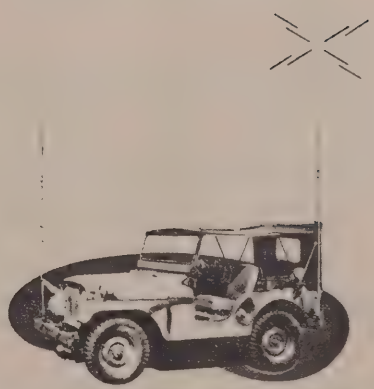
(9) To select the NET channel, the lock button must be pressed to permit the switch to be rotated into this position.

(10) Operate the POWER ON-OFF switch to the OFF position when station is to be shut down.

CHANNEL A
SUBSCRIBER #1



MOBILE RADIO CENTRAL



CHANNEL B
SUBSCRIBER #5

FIGURE 2.1

RADIO CENTRAL SYSTEM

CHAPTER 3

THEORY OF OPERATION

Section I. INTRODUCTION

24. Scope

a. System theory is presented to provide an understanding of how the several units are inter-related in the various operations of the radio sets. Such an understanding is an effective aid in trouble shooting the equipment to isolate a defective unit.

b. Detailed circuit theory of individual units is not discussed, except insofar as the units are inter-connected in a common circuit. Most of the information presented in this chapter is concerned with system aplication of the several units. Complete details on the individual units are published in the MAINTENANCE section.

25. Basic system block diagram

a. Basically each of the subscriber sets consists of: a receiver, a transmitter and a control unit. These basic units are the essentials of the systems. The power supplies, cables, mountings and miscellaneous equipment are supplied to make the basic units perform their function of transmitting or receiving.

b. In an actual system installation, a handset, microphone and speaker are provided at each Control Unit. The switching provisions on the unit allow selection of the mode of operation and channel selection. The control facilities are extended from the individual units to the Control Unit through appropriate cables.

c. An adaptation of the basic system allows the radio set to function as full duplex operation on Channels 1 and 2.

d. Another adaptation of this system provides a conference channel and a net channel in a simplex mode. The push-to-talk switch must be used in this mode of operation.

e. A typical basic system block diagram of the Radio Central System is displayed in Figure 3.1.

NOTES

1. UNLESS OTHERWISE INDICATED; ALL RESISTORS ARE IN OHMS, ±10%.

2. WITH THE EXCEPTION OF JACKS AND PLUGS, REFERENCE DESIGNATIONS ARE ABBREVIATED. ADD 3000 TO REFERENCE NUMBERS, THAT IS; READ R1 AS R3001.

REGOHM VR1 6.0VAC SEE FIGURE 4.16

YMTR PWR SUP SEE FIGURE 4.13C

RCVR PWR SUP SEE FIGURE 4.12C

J3201 — C B D A TB1 — B K H J A D F C E P3201

J3101 — D F B E C A P3101

TRANSMITTER FILAMENT VOLTAGE ADJUST R4 10 25W

+27 VDC

45 SECOND TIME DELAY RELAY (NORMAL) K3

45 SECOND TIME DELAY RELAY (NET) K4

F3 F1 F2 F5

R3 90 5W NC

TRANSMITTER FILAMENT RELAY K6 — NET ↔ NORMAL

REGULATOR V2 6680

R1 3900 1W

R2 1MEG ½W

VOLTAGE REFERENCE V1 0A2

DYNAMOTOR DELAY RELAY (NORMAL) K2

DYNAMOTOR DELAY RELAY (NET) K7

C1 POWER RELAY K1 C2 S1 S2

TRANSMITTER PLATE RELAY K5

F8 F6 F7 F4

P 44 45 38 37 40 42 26 32 30 34 36 35 31 29 33 8 10 9 12 13 11 14 16 3 15 6 4 23 21 28 24 27 22 J3003

27 VDC POWER INPUT

DYNAMOTOR RELAY

+350 VDC ARMING

+27 VDC TO RELAYS

OPERATE POWER SWITCH

DYNAMOTOR OPERATE (NORMAL)

GROUND

DYNAMOTOR OPERATE (NET)

+27 VDC MAIN POWER INDICATOR

+27 VDC MISC

NET OPERATE

+350VDC

+27 VDC FIL (NET)

+27 VDC FIL (NORMAL)

6.0 VAC FIL (NET)

6.0 VAC FIL (NORMAL) 5A

6.0 VAC FIL SHIELD

GROUND

+200VDC 125ma

+27 VDC MISC POWER 70VDC 100ma

+27 VDC (FIL)

GROUND

+150VDC (REG)

-70VDC bias

+100VDC 20ma

+200VDC 100ma

DYNAMOTOR — RECEIVER

CONTROL UNIT

TRANSMITTER

RECEIVER

FIGURE 4.11C POWER SUPPLY CABINET

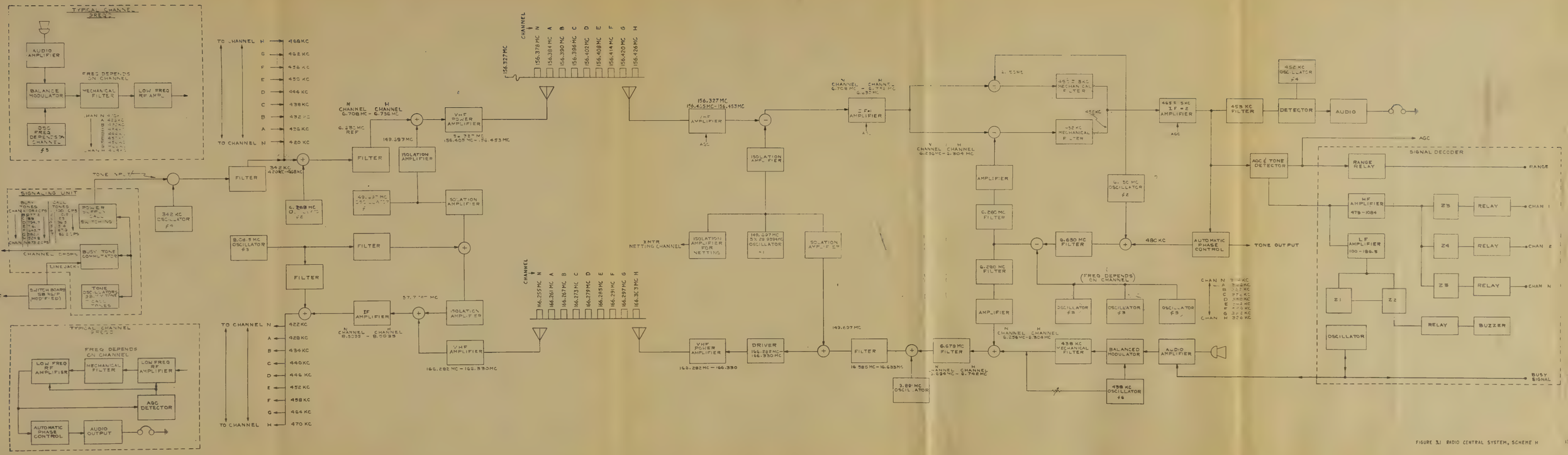


FIGURE 3.1 RADIO CENTRAL SYSTEM, SCHEME H

26. System Diagrams

a. Figures 3.2 and 3.3 are the block diagrams for the Receiver and Transmitter respectively.

b. Figure 3.4 is the functional control diagram.

c. Figure 4.1 is the inter-connecting cable diagram.

d. Figures 4.2A, B, C display the Receiver Cabinet. Figure (A) is top view, (B) is bottom view, and (C) is schematic diagram of intra-unit wiring.

e. Figures 4.3A, B, C and D through 4.6A, B, C and D display the (A) top view, (B) bottom view, (C) tube socket voltage chart, and (D) schematic diagrams of the units in the Receiver Cabinet.

f. Figures 4.7A, B and C display the Transmitter Cabinet. Figure (A) is top view, (B) is bottom view, and (C) is schematic diagram of intra-unit wiring.

g. Figures 4.8A, B, C and D through 4.10A, B, C and D display the (A) top view, (B) bottom view, (C) tube socket voltage chart, and (D) schematic diagrams of the units in the Transmitter Cabinet.

h. Figures 4.11A, B, and C display the Power Supply Cabinet and schematic diagram.

i. Figures 4.12A, B, and C through 4.13A, B and C display the units in the Power Supply cabinets and schematic diagrams of those units.

j. Figure 4.14 is the Dynamotor schematic diagram.

k. Figures 4.15A, B and C display the Control Unit and the schematic diagram.

Section II. POWER DISTRIBUTION AND CONTROL CIRCUITS

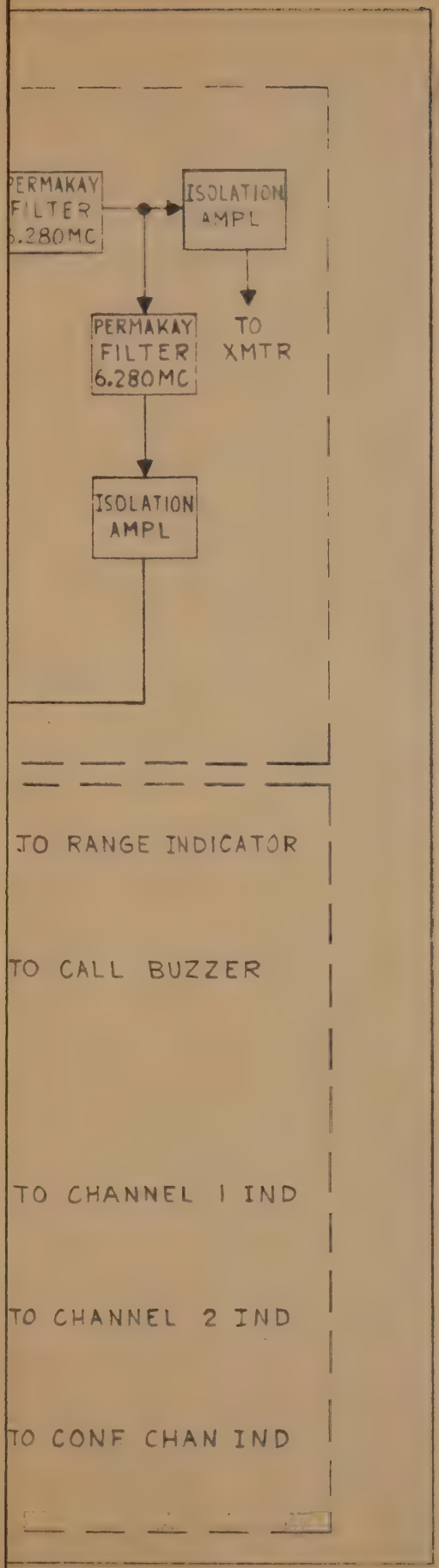
27. General Description

a. The source of power for this equipment is a heavy duty generator provided with the vehicle.

b. Low voltage power for the control circuits is taken from the vehicle electrical system. Functional distribution is shown in figure 3.4.

c. Power from the vehicle generator is delivered to the Power Supply Cabinet, Figure 4.11C.

d. Further distribution of power and the Control circuits is displayed in figure 4.1 and associated drawings.



CEIVER (BLOCK DIAGRAM)

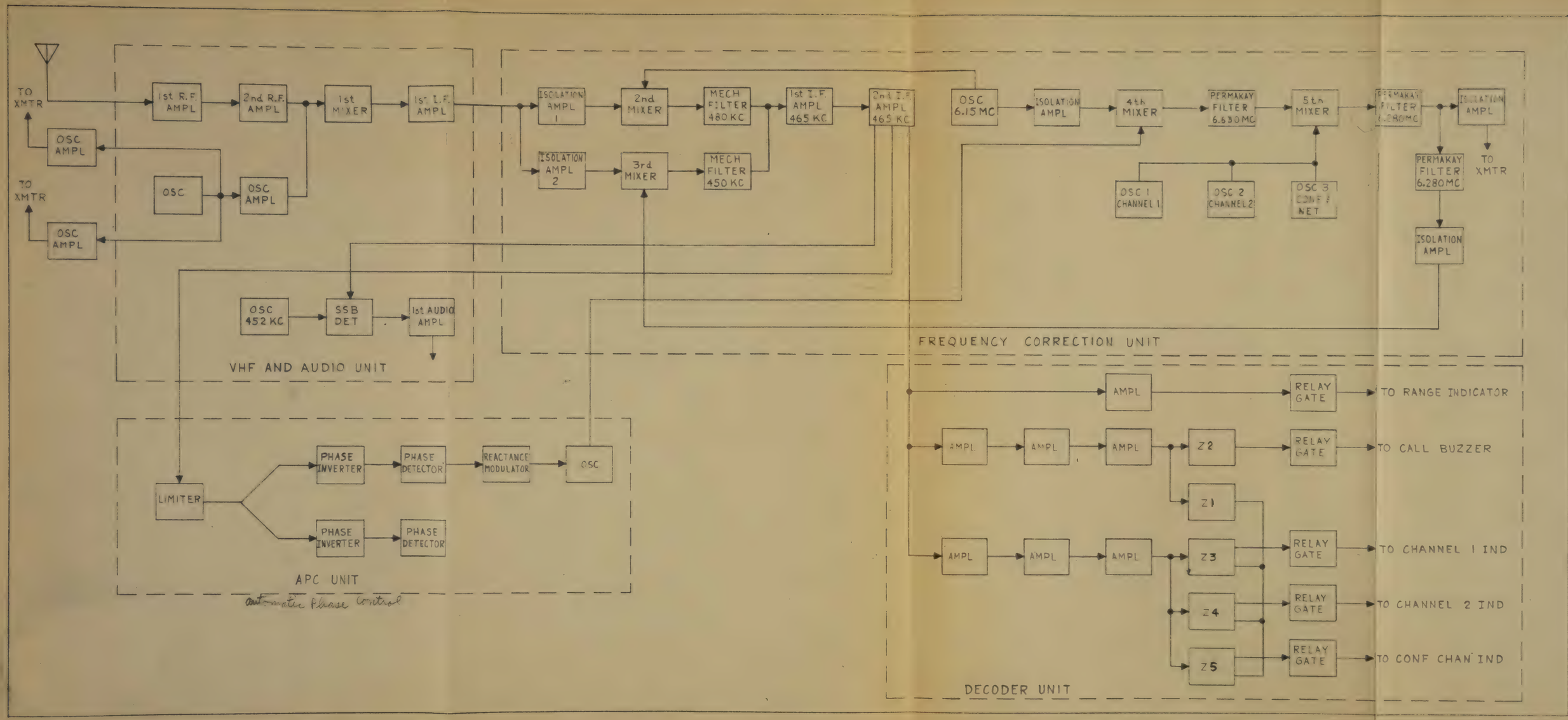
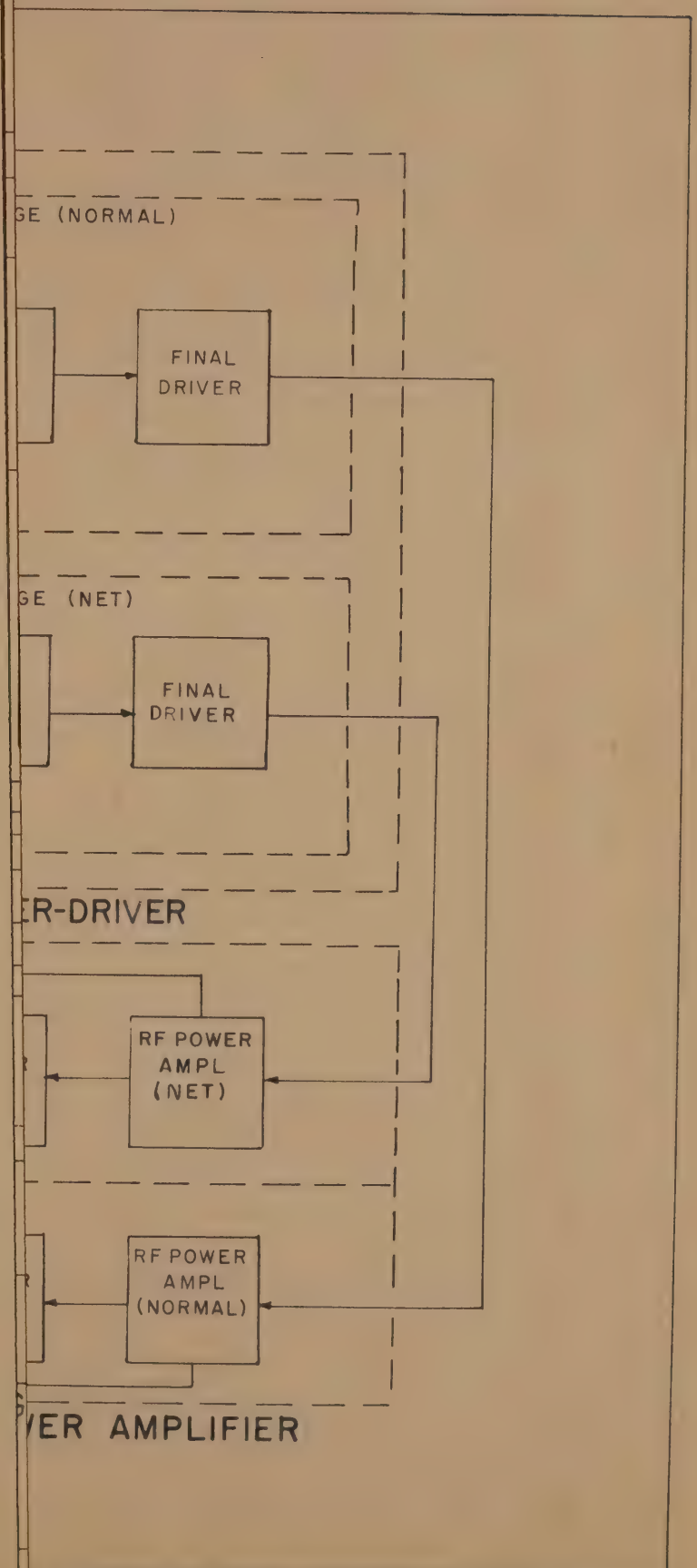


FIGURE 3.2 SUBSCRIBER RECEIVER (BLOCK DIAGRAM)



TRANSMITTER (BLOCK DIAGRAM) 16

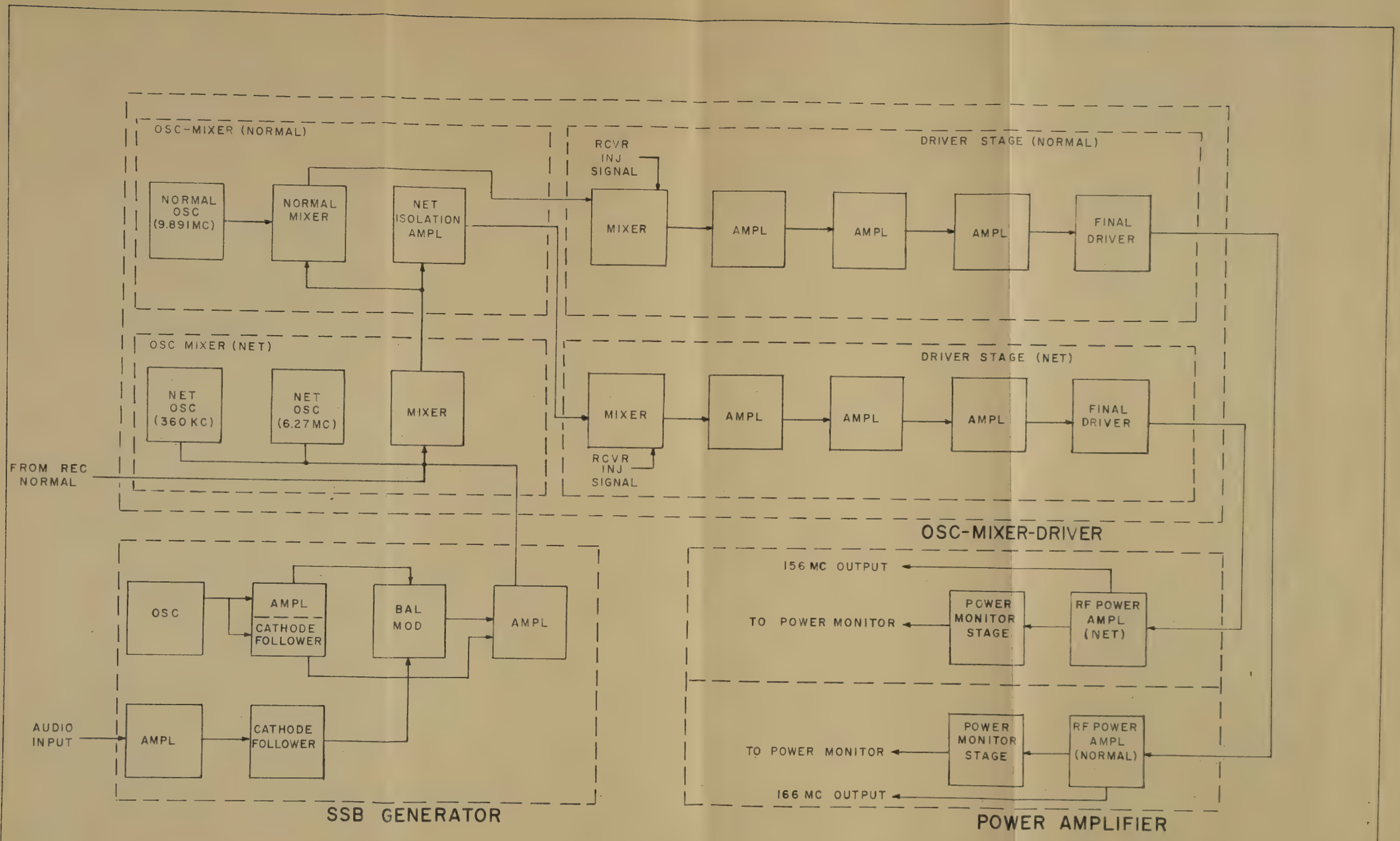


FIG. 3.3 SUBSCRIBER TRANSMITTER (BLOCK DIAGRAM)

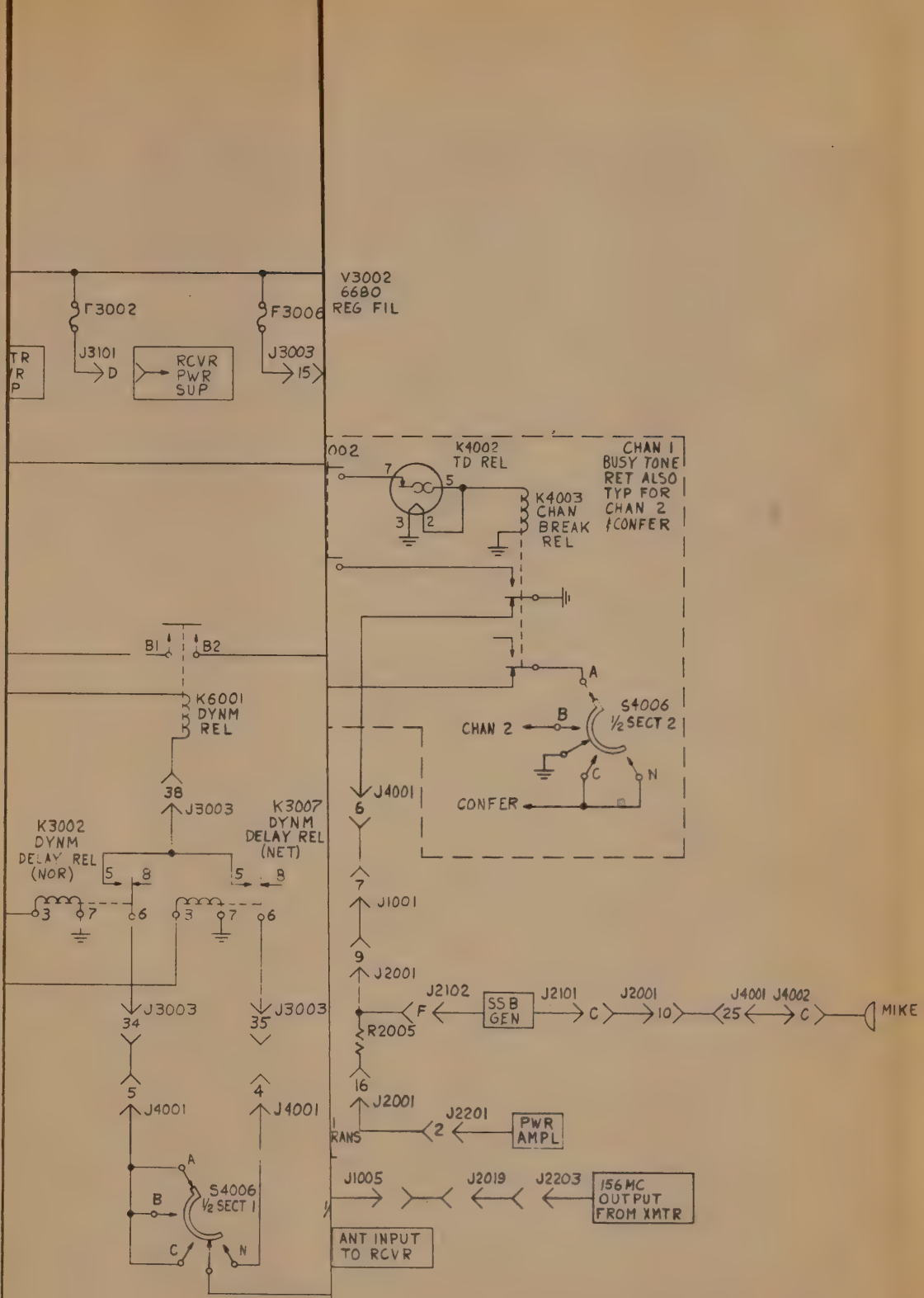


FIGURE 3.4 DIAGRAM CONTROL, FUNCTIONAL

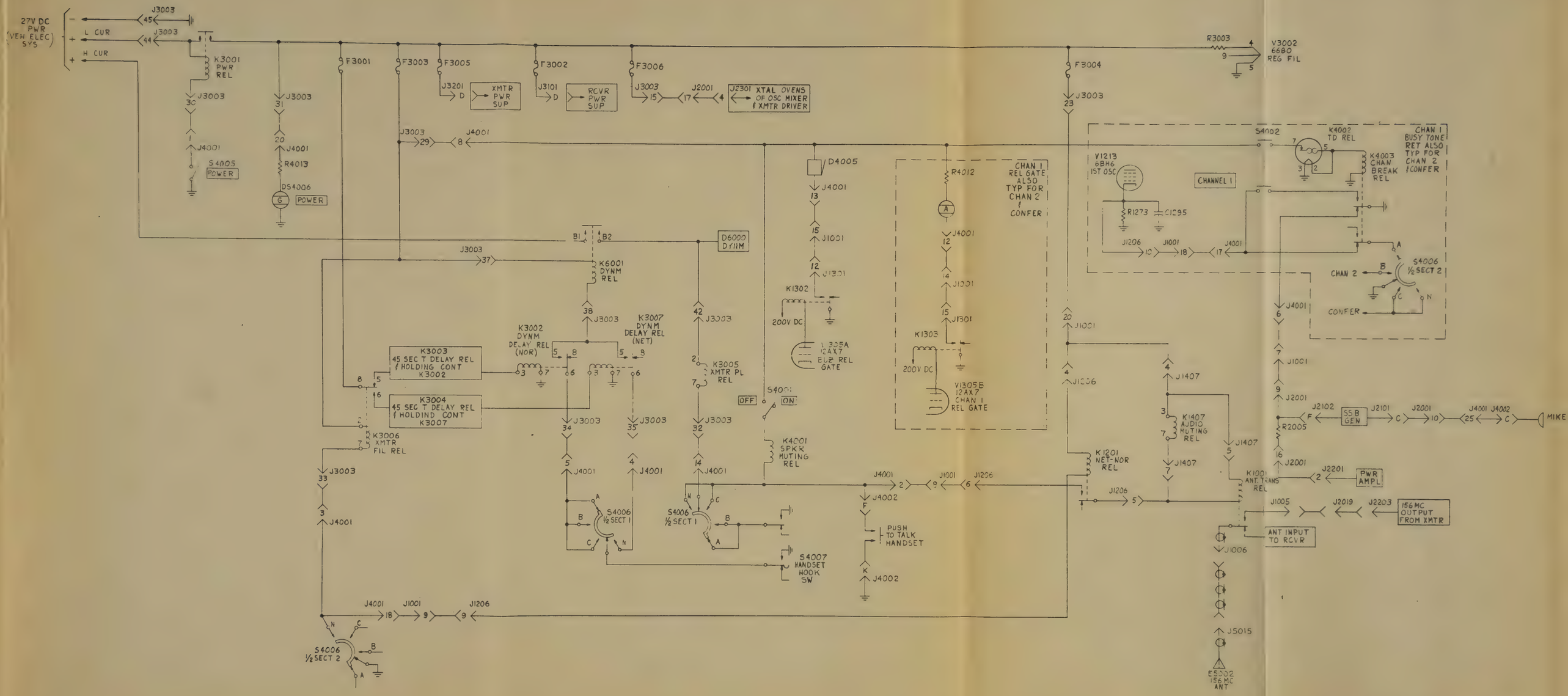


FIGURE 3.4 DIAGRAM CONTROL, FUNCTIONAL

CHAPTER 4

MAINTENANCE

Section I. TROUBLE SHOOTING

28. General

a. Trouble-shooting of this equipment is expected to be handled by engineers or highly competent technicians.

b. These units are factory adjusted with special laboratory equipment. Readjustment in the field should not be attempted without this special equipment.

c. Primary trouble-shooting information is graphically displayed in photographs, charts and schematic diagrams.

d. The basic schematic diagram is shown in figure 4.1 and proceeds through the drawings indicated in this figure.

29. Receiver Cabinet. (Figure 4.2A, 4.2B and 4.2C).

a. The 4.2A and B figure display the units and their location in the receiver cabinet. Figure 4.2C displays the circuits connecting these units.

b. The VHF signal received at the antenna contains the voice frequency signals and the calling and busy signals. These signals pass through the VHF portion of the VHF and audio chassis. The signals are then transferred to the Frequency Correction Chassis.

c. The voice frequency is returned to the audio portion of the VHF and audio unit. The output from this unit is passed on to the Control Head.

d. The Tone Signals are passed to the Decoder unit and the selected channel indicators are actuated in the Control Unit.

e. Circuits common to all units are provided from J1101.

30. VHF Receiver and Audio Unit. (Figures 4.3A, 4.3B, 4.3C and 4.3D).

a. The figures 4.3A and 4.3B call-out the location of the tubes, crystals, jacks and adjustment points.

b. Figure 4.3C displays the tube socket voltages. (Antenna disconnected).

c. Refer to figure 4.3D. The VHF portion of this unit consists of a super-heterodyne circuit with a separate local oscillator. This oscillator provides the frequency for conversion and the 149.67 mc signals to the transmitter NET and NORMAL circuits.

d. The AUDIO portion of this circuit provides the second conversion frequency, a SSB detector and signal amplification for the audio frequency to the Control Unit.

e. Common circuitry is provided through J1407.

31. Frequency Correction Unit. (Figures 4.4A, 4.4B, 4.4C and 4.4D).

a. Figures 4.4A and 4.4B call-out the pertinent components and adjustment points of this unit.

b. Figure 4.4C displays the tube socket voltages. (Antenna disconnected).

c. Refer to figure 4.4D. The signal passes through two isolation amplifier and mixer stages and two mechanical filters to the IF amplifier section. From this section, a tone output is taken to the decoder, to the APC unit and to the SSB detector.

d. The channel oscillators are provided in this unit.

e. An input signal from the APC unit is connected in the frequency correction circuitry for the transmitter NORMAL circuit.

32. Automatic Phase Control Unit. (Figures 4.5A, 4.5B, 4.5C and 4.5D).

a. Figures 4.5A and 4.5B call-out the tubes and reference designations of major components.

b. Figure 4.5C displays the tube socket voltages. (Antennas disconnected).

c. Refer to figure 4.5C. The signal is presented to this unit for phase comparison and correction.

d. The noise squelch circuit is not used.

33. Receiver Decoder Unit. (Figures 4.6A, 4.6B, 4.6C and 4.6D).

a. Figures 4.6A and 4.6B call-out the tubes, by function, and circuit adjustment points.

b. Figure 4.6C displays the tube socket voltages. (Antenna disconnected).

c. Refer to figure 4.6D. The range AGC signal is passed to the Relay Gate. When relay KI is energized the out-of-range lamp is illuminated.

d. The CALL signal passes through amplifier stages to the vibrasponders. The appropriate vibrasponder will cause a Relay Gate to pass current and illuminate a channel lamp on the Control Unit.

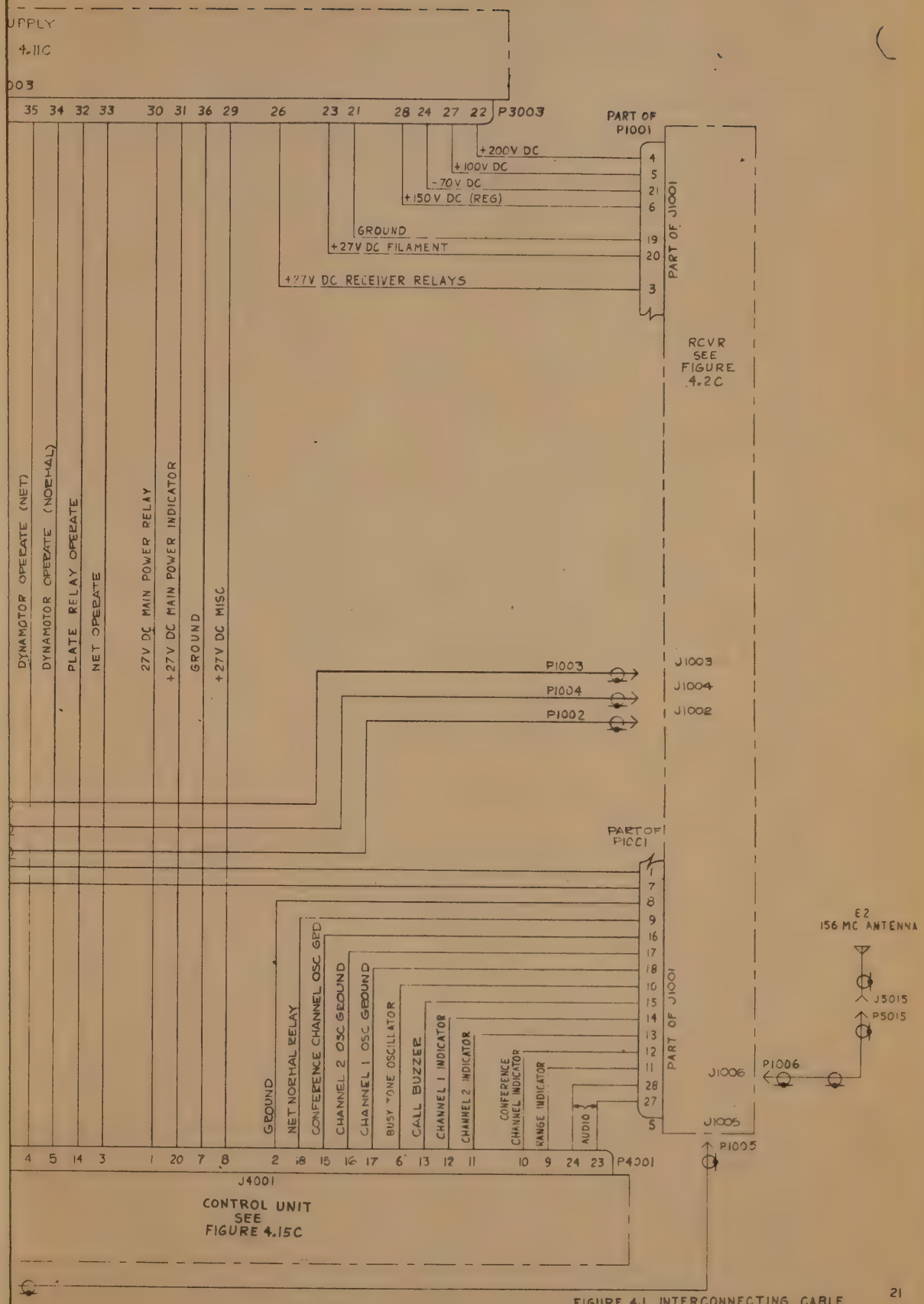


FIGURE 4.1 INTERCONNECTING CABLE

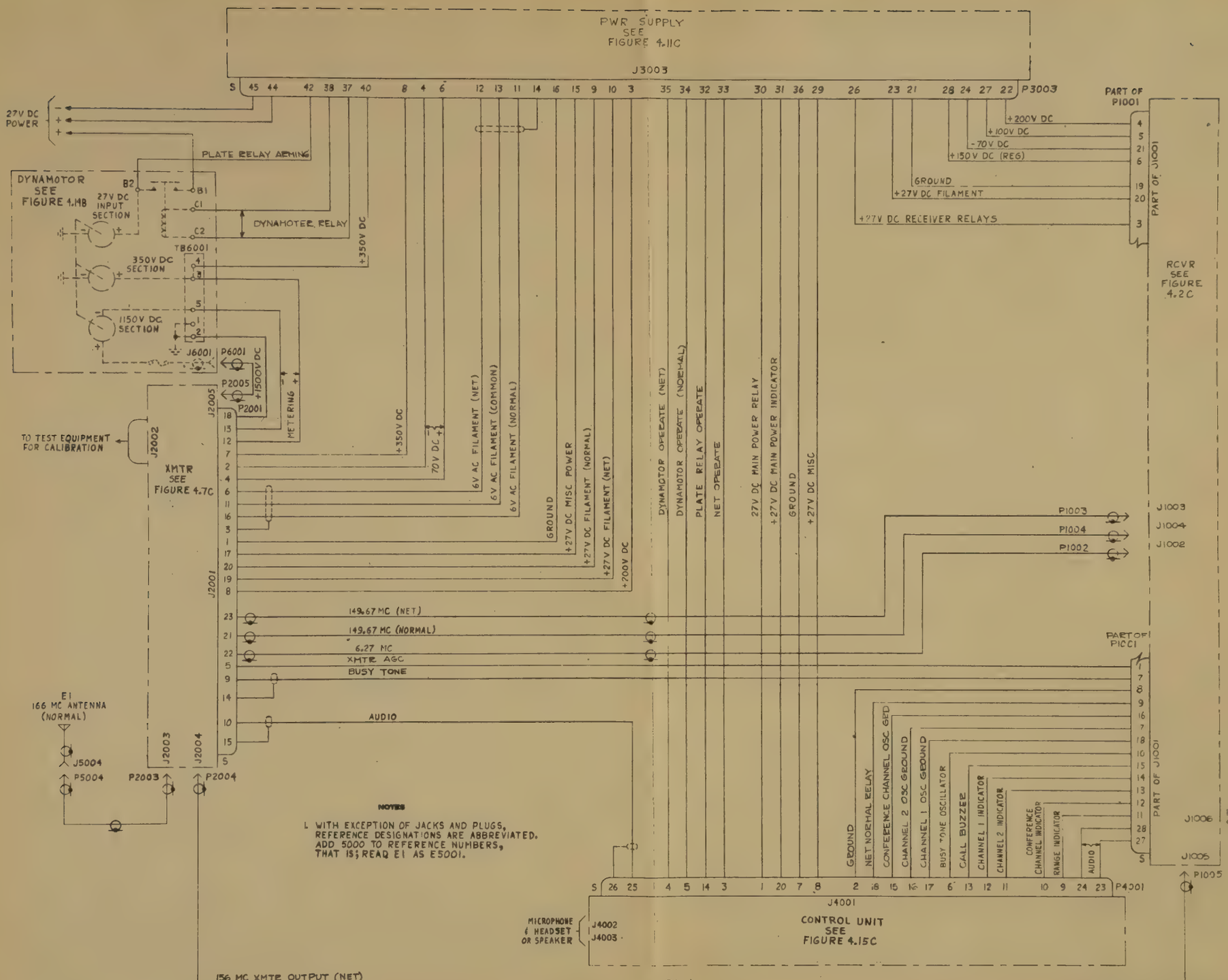


FIGURE 4.1 INTERCONNECTING CABLE

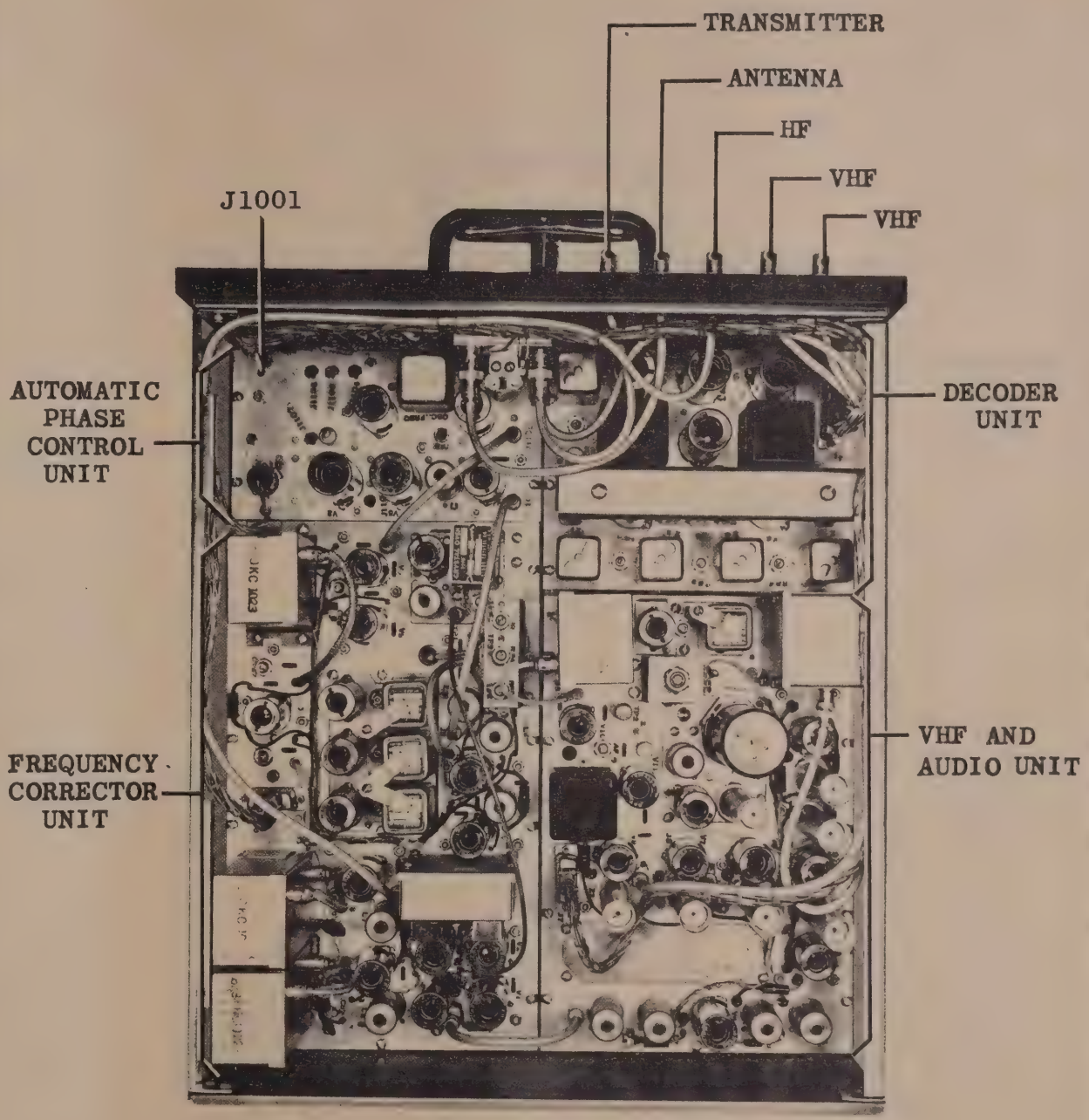


FIGURE 4.2A RECEIVER CABINET (TOP VIEW)

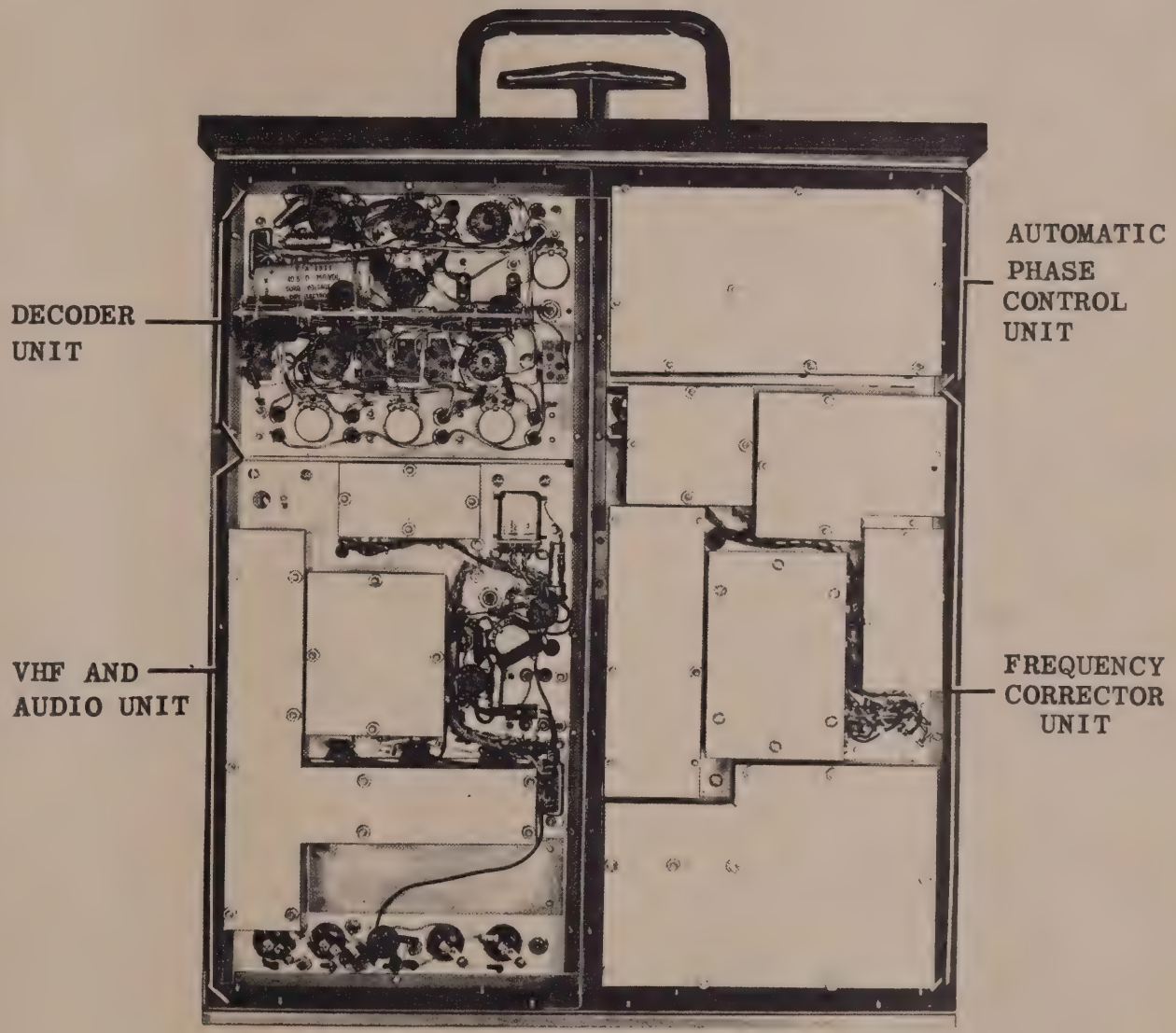


FIGURE 4.2B RECEIVER CABINET (BOTTOM VIEW)

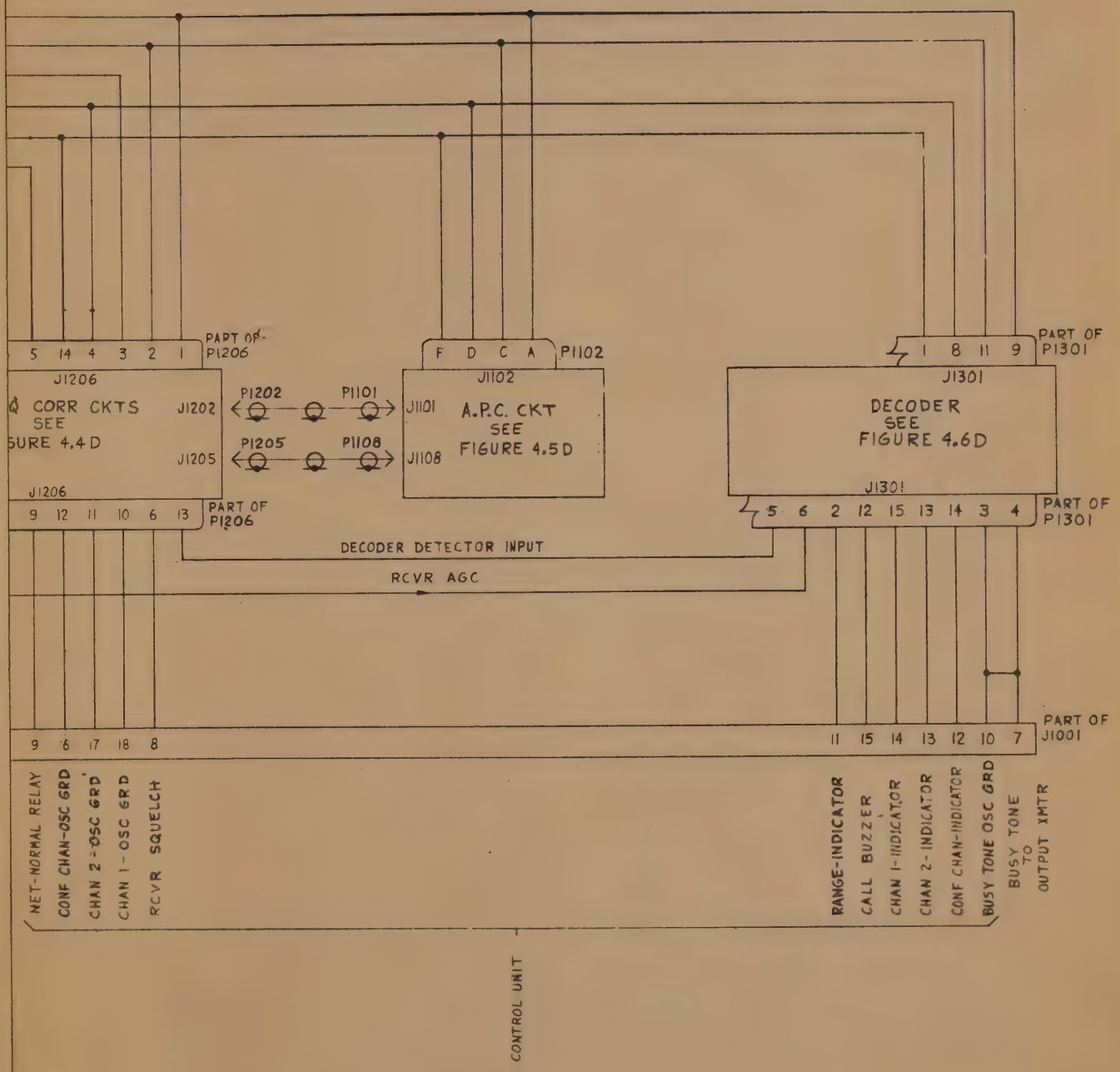


FIGURE 4.2C RECEIVER CABINET

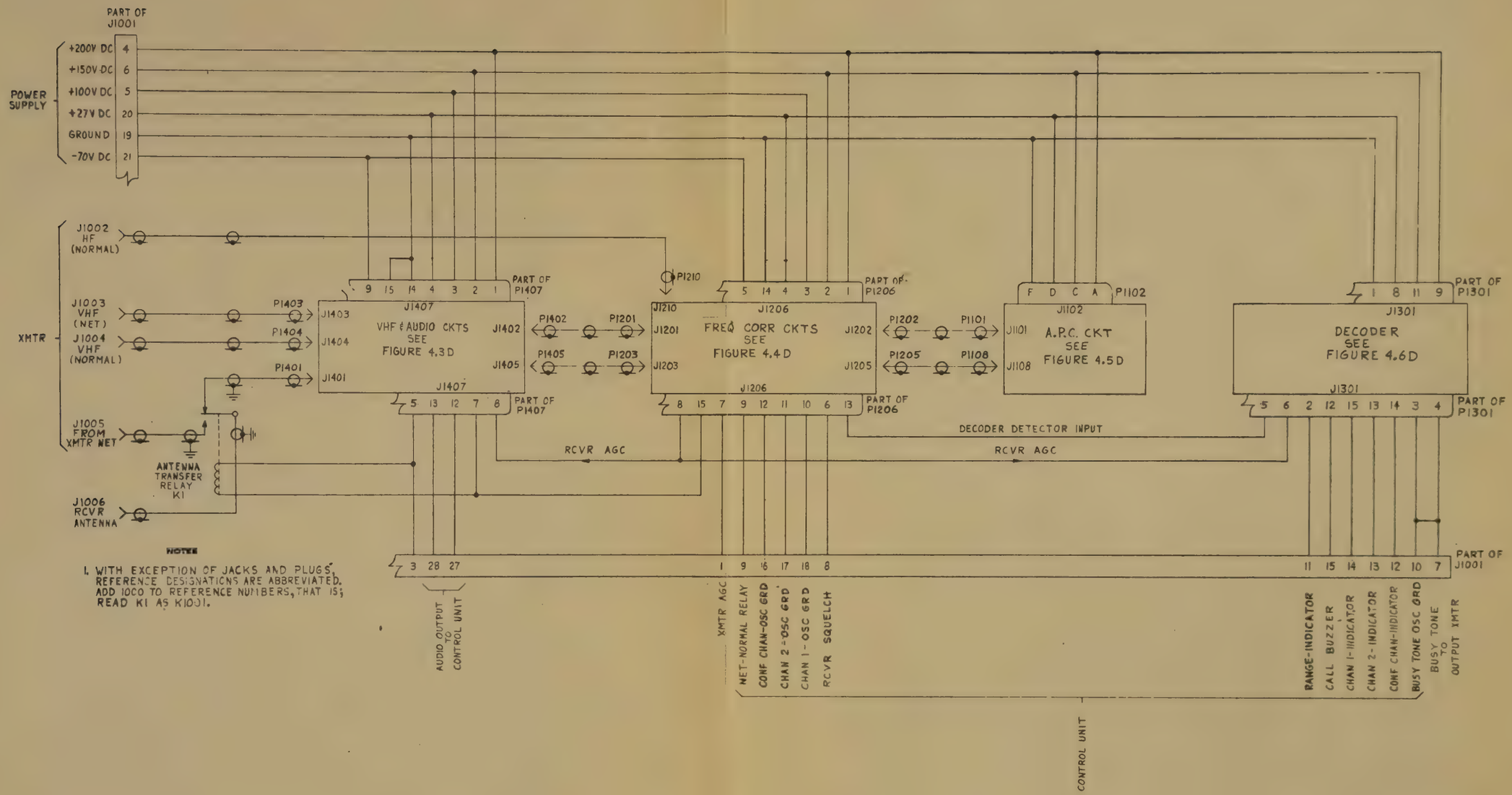


FIGURE 4.2C RECEIVER CABINET

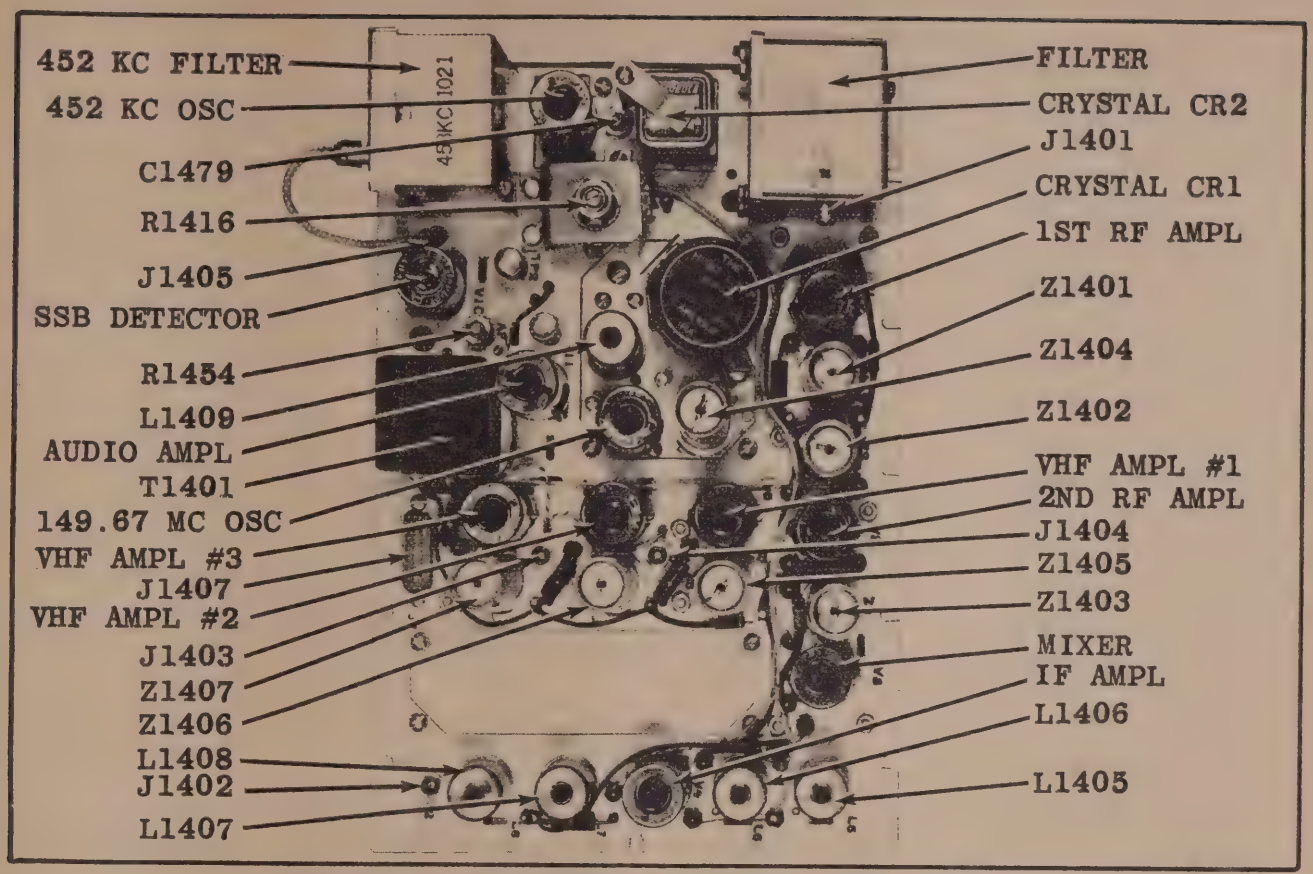


FIGURE 4.3A VHF AND AUDIO (TOP VIEW)

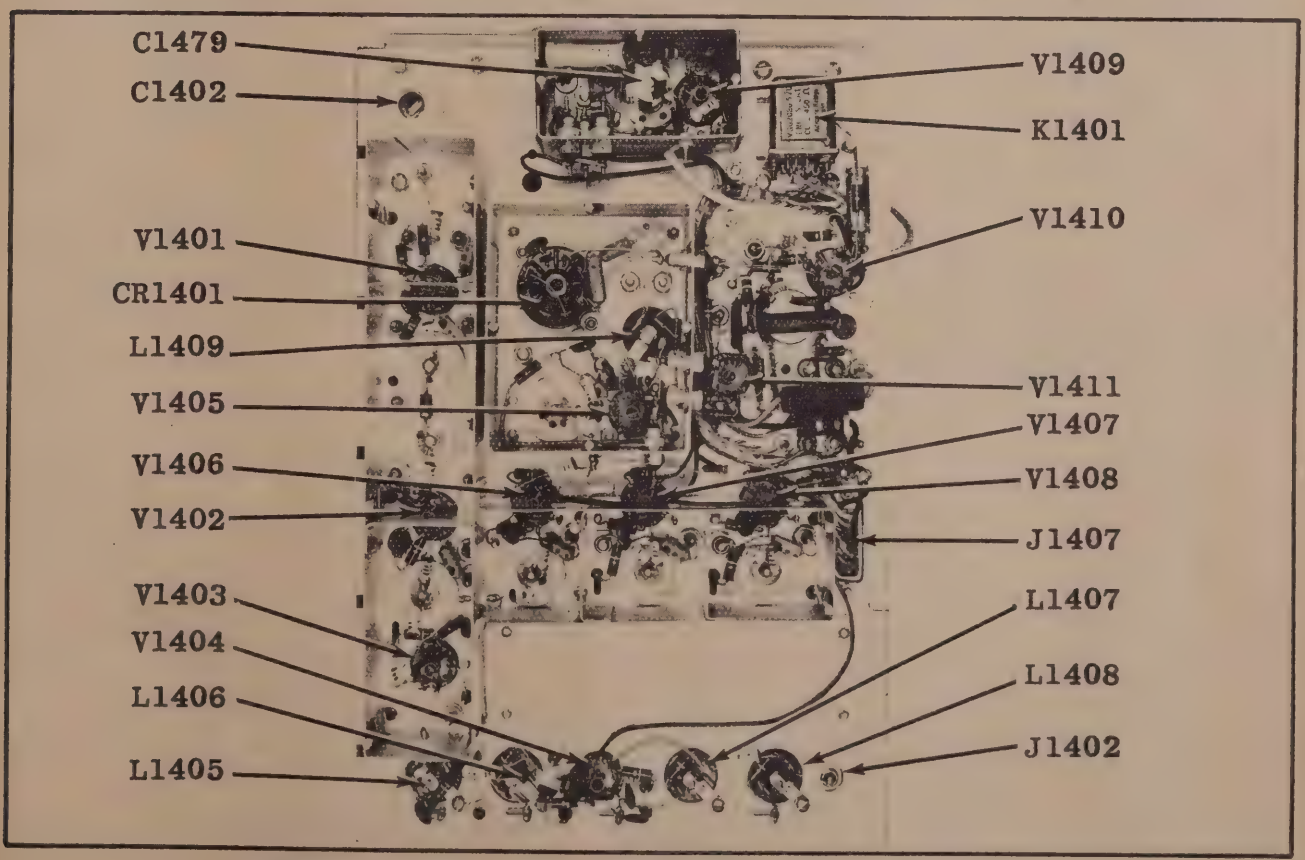
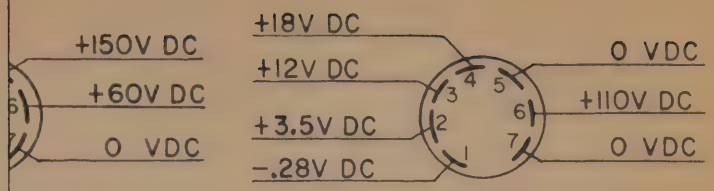
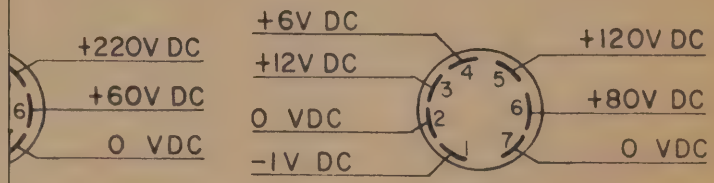


FIGURE 4.3B VHF AND AUDIO (BOTTOM VIEW)



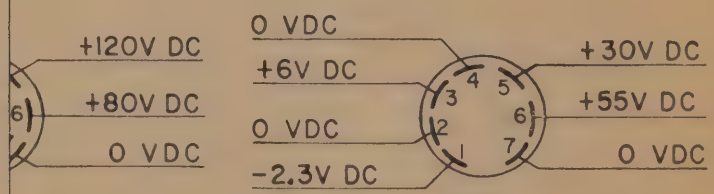
V3
6AK5/W

/W



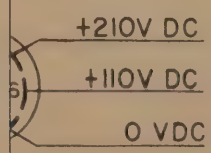
V6
6AK5/W

/W



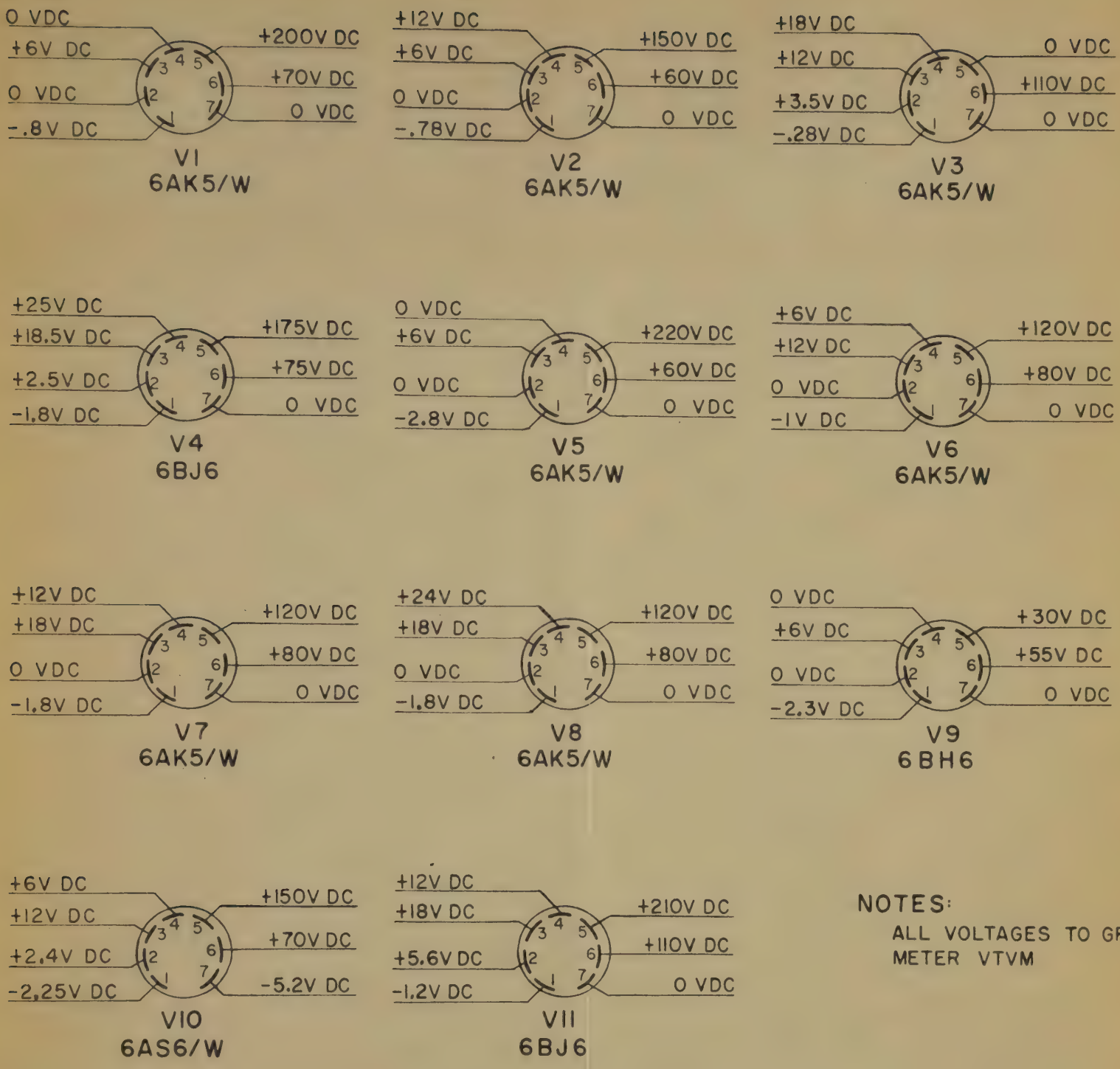
V9
6BH6

W



NOTES:
ALL VOLTAGES TO GROUND
METER VTVM

RT. VHF RECEIVER AND AUDIO ASSEMBLY.



NOTES:

ALL VOLTAGES TO GROUND METER VTVM

FIGURE 4.3C. TUBE SOCKET VOLTAGE CHART. VHF RECEIVER AND AUDIO ASSEMBLY. (SUBSCRIBER)

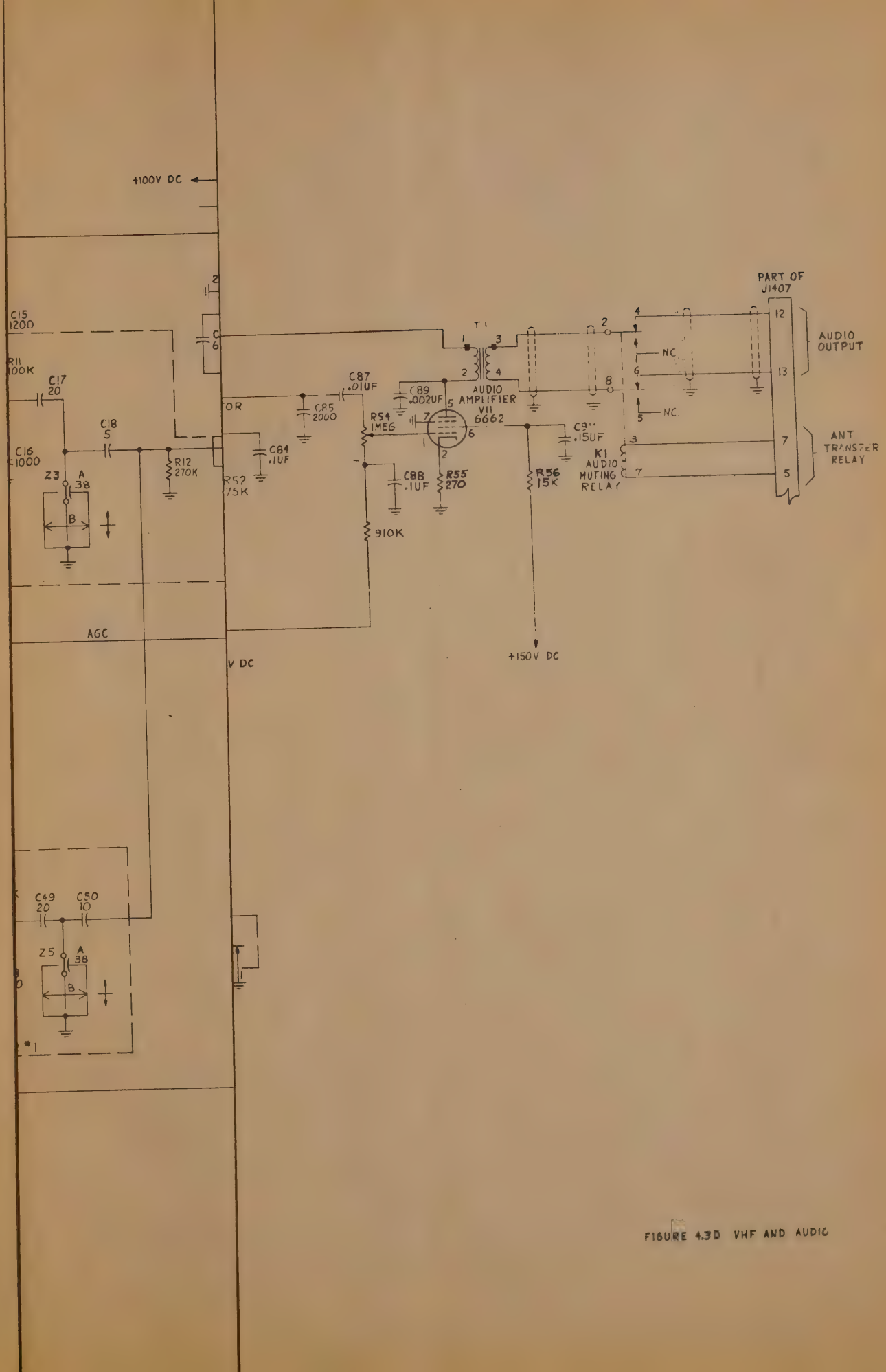


FIGURE 4.3D VHF AND AUDIO

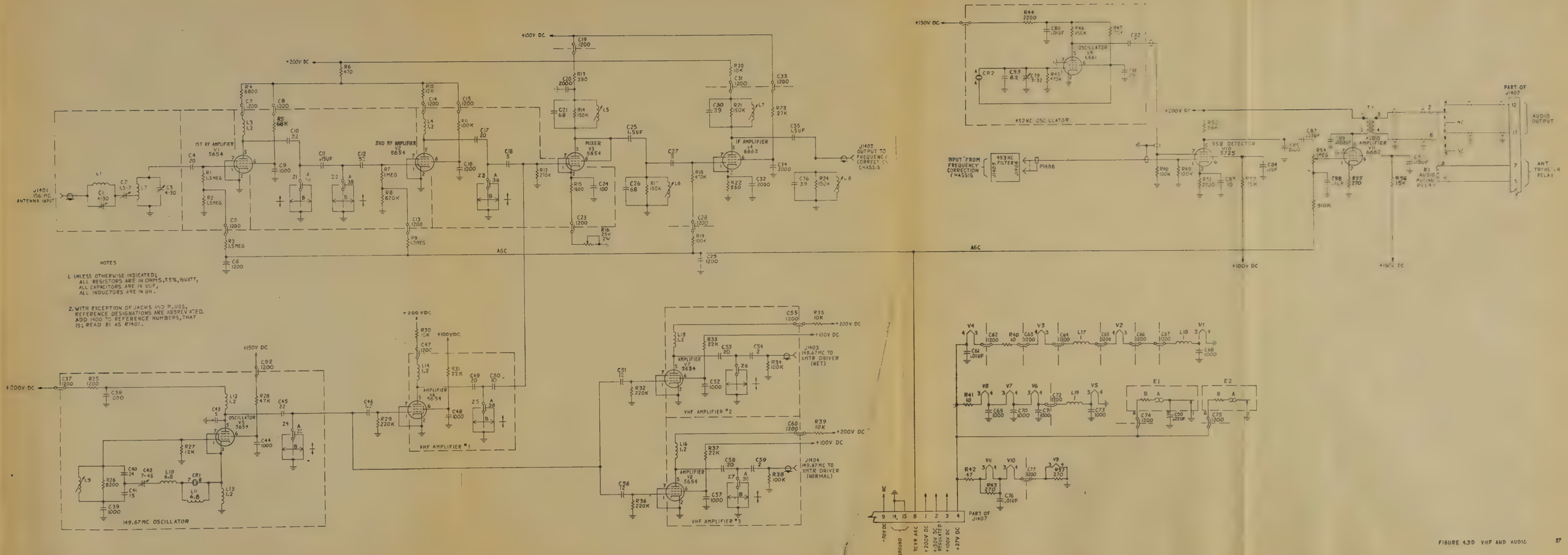


FIGURE 4.3D VHF AND AUDIO

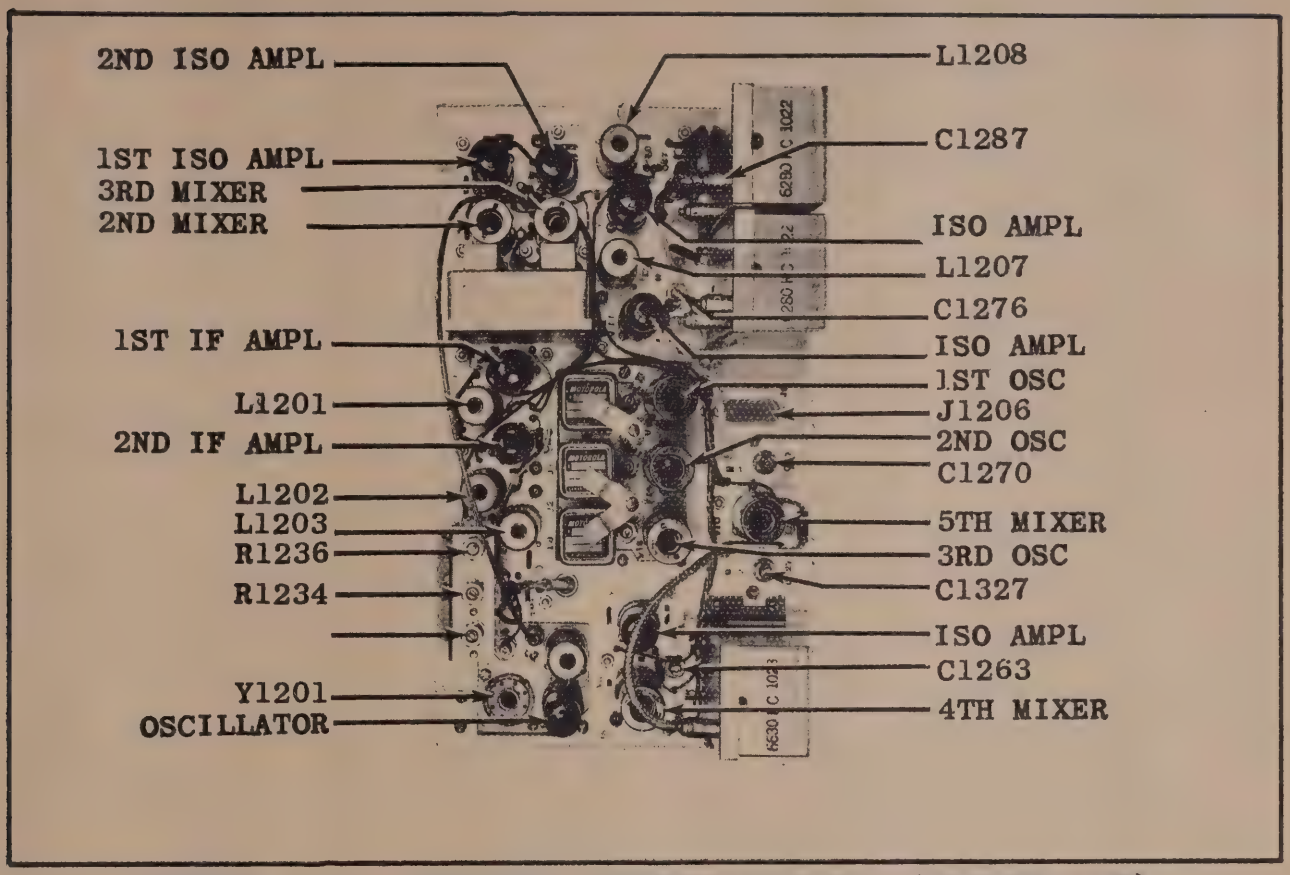


FIGURE 4.4A FREQUENCY CORRECTION UNIT (BOTTOM VIEW)

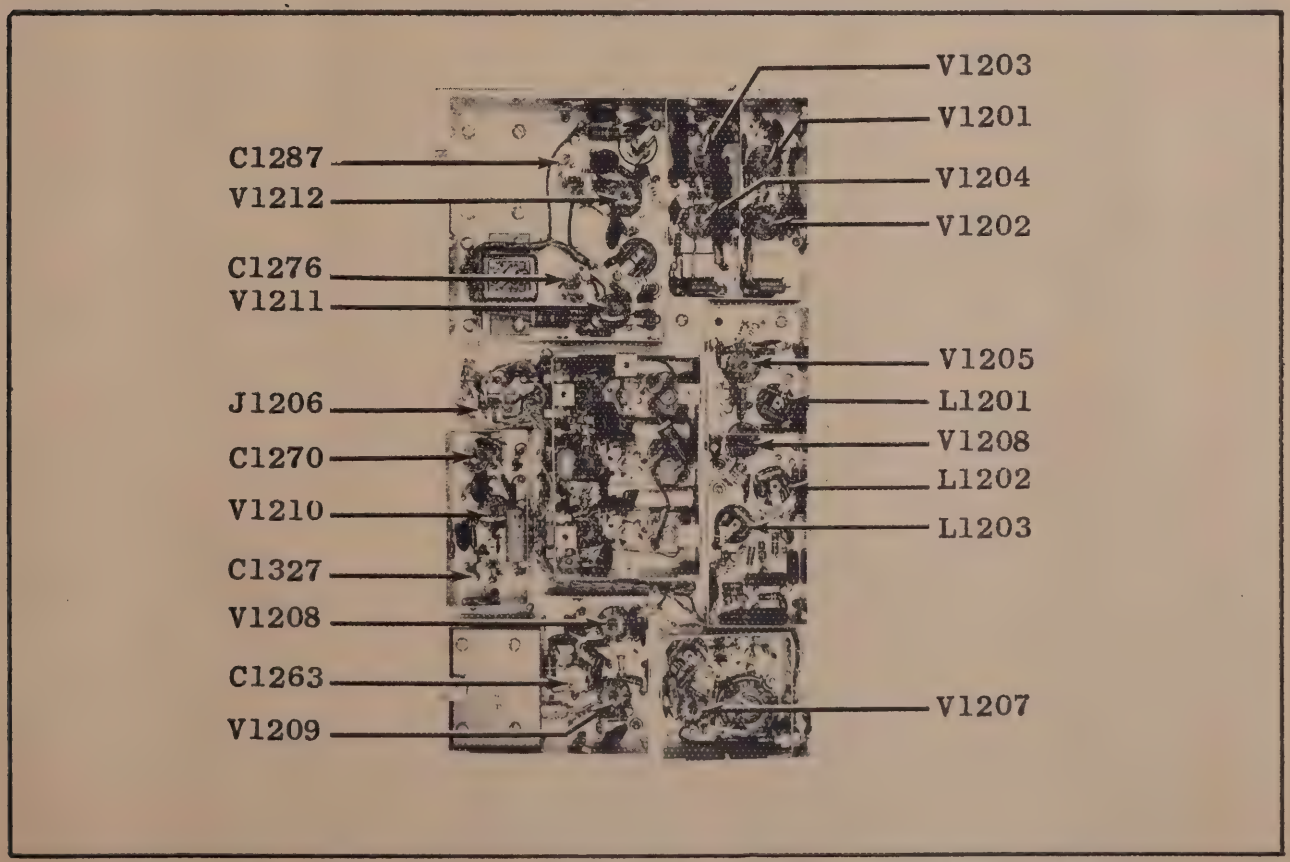
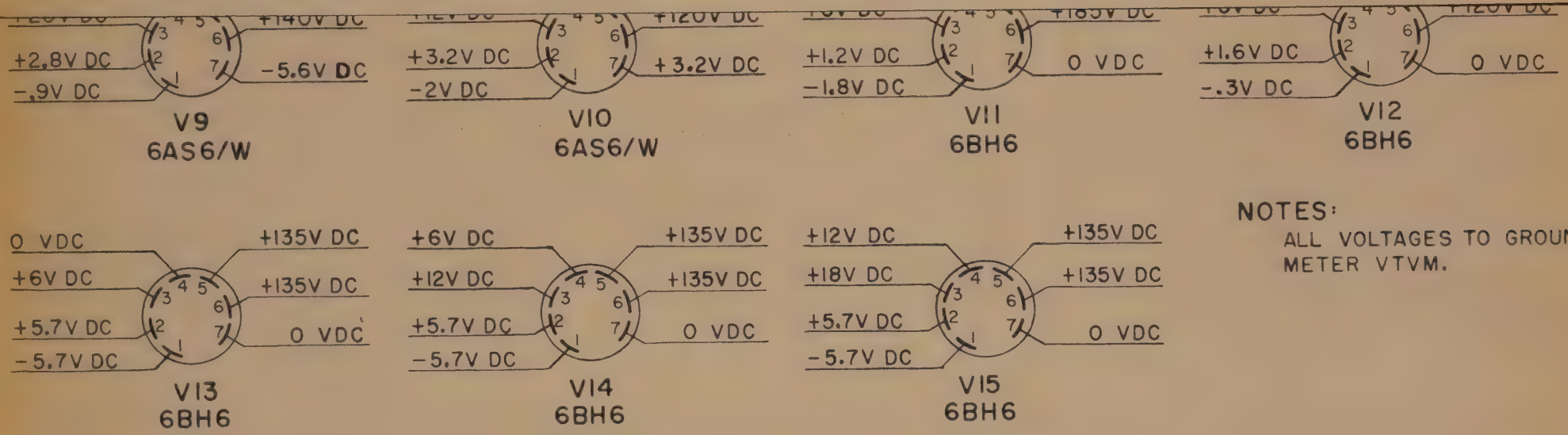
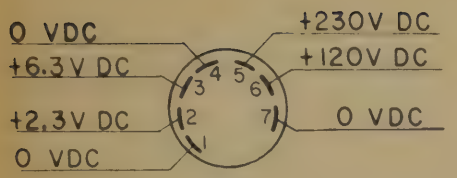


FIGURE 4-4B FREQUENCY CORRECTION UNIT (TOP VIEW)

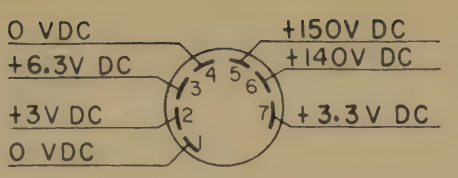


NOTES:
ALL VOLTAGES TO GROUND.
METER VTVM.

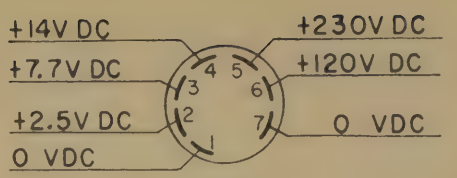
FIGURE 4.4C. TUBE SOCKET VOLTAGE CHART. FREQUENCY CORRECTION CIRCUITS. (SUBSCRIBER)



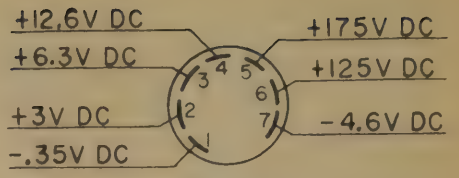
V1
6BH6



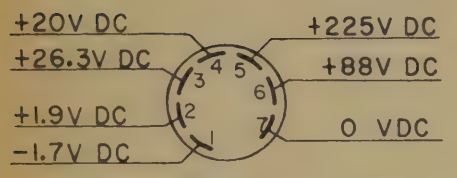
V2
6AS6/W



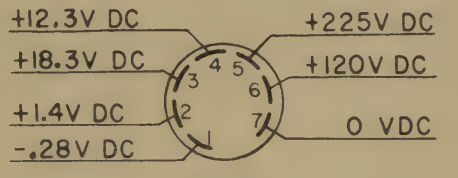
V3
6BH6



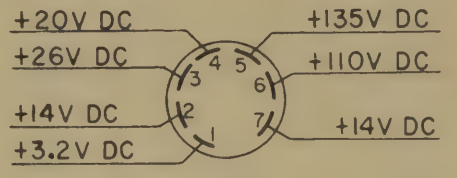
V4
6AS6/W



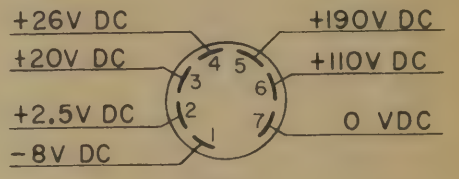
V5
6BJ6



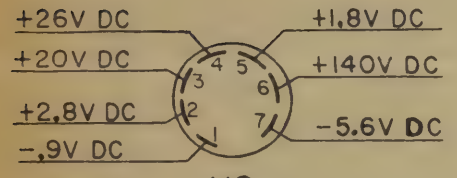
V6
6BH6



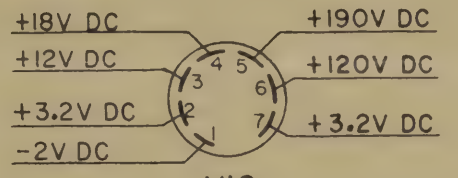
V7
6BH6



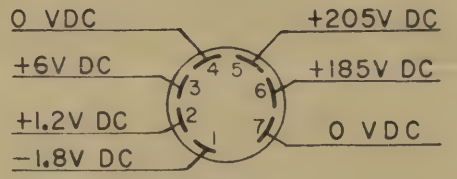
V8
6BH6



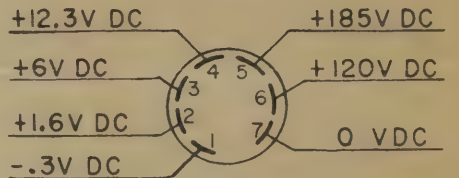
V9
6AS6/W



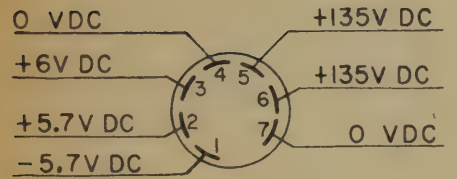
V10
6AS6/W



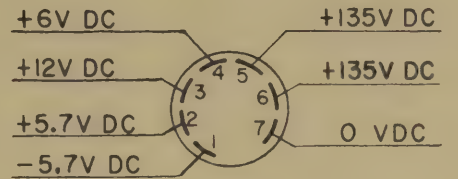
V11
6BH6



V12
6BH6



V13
6BH6



V14
6BH6

V15
6BH6

NOTES:
ALL VOLTAGES TO GROUND.
METER VTVM.

FIGURE 4.4C. TUBE SOCKET VOLTAGE CHART. FREQUENCY CORRECTION CIRCUITS, (SUBSCRIBER)

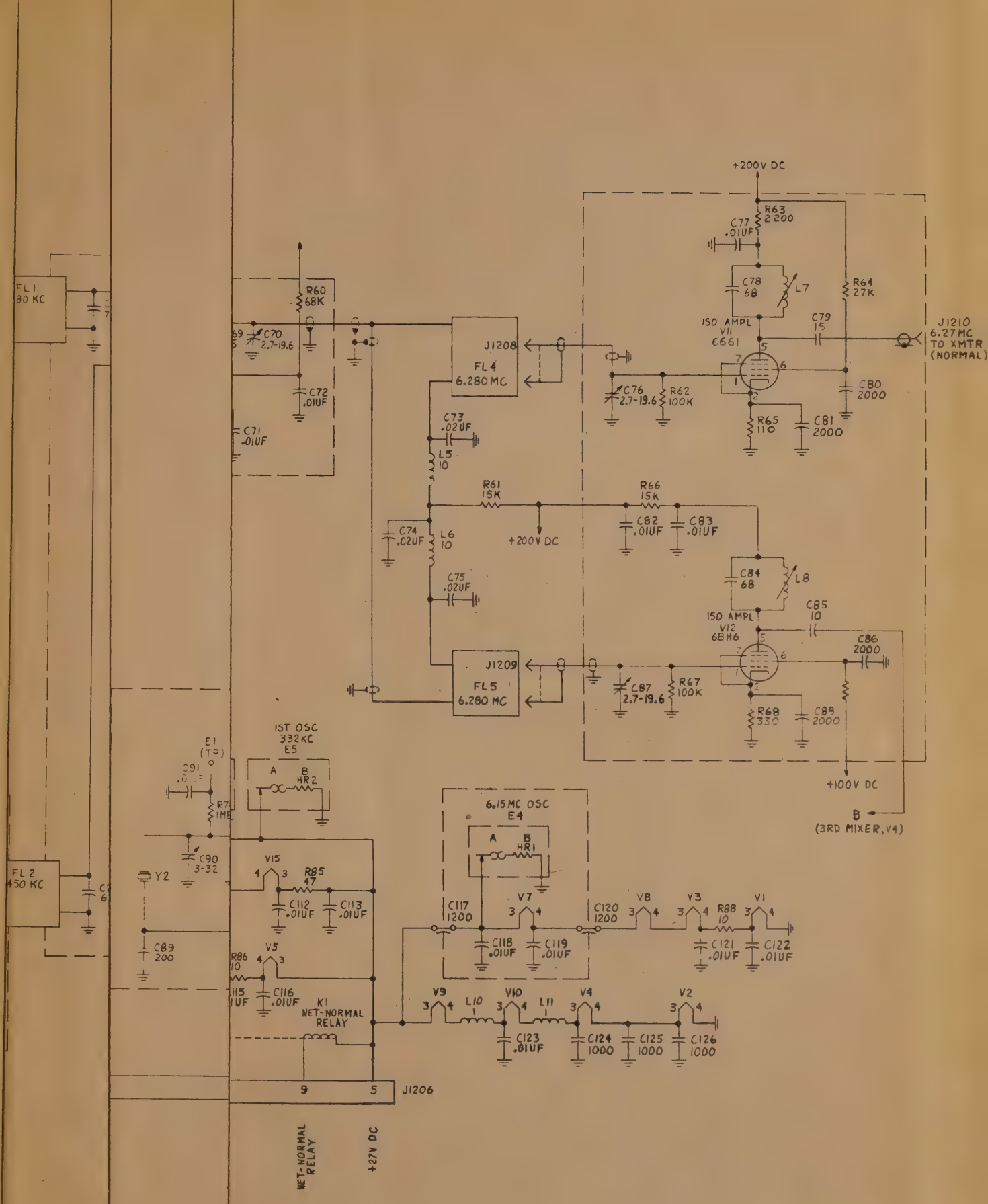


FIGURE 4.4D FREQUENCY CORRECTION UNIT

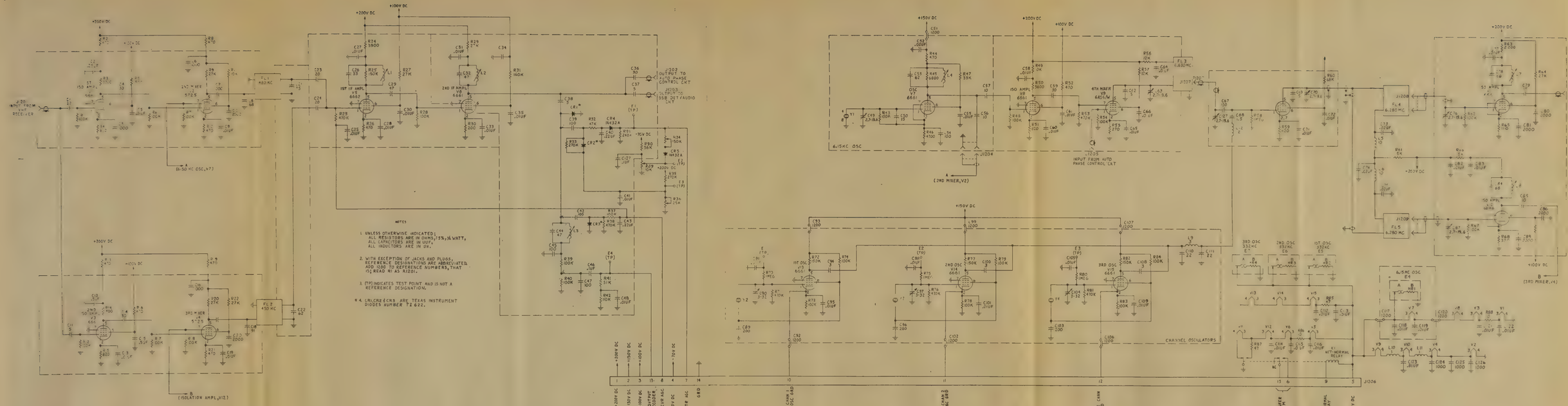

+350V DC
+200V DC
+100V DC
J201 INPUT FROM 455KC I.F.
1ST MIXER 6BE6
2ND MIXER 6BE6
FL1 480 KC
FL2 450 KC
FL3 6.680MC
FL4 6.180 MC
FL5 6.280 MC
6.15MC OSC
6.45KC OSC
1ST IF AMPL 6662
2ND IF AMPL 6662
3RD MIXER 6AL5
4TH MIXER 6AL5
150 AMPL 6661
50 AMPL 6661
J202 OUTPUT TO AFC PHASE CONTROL CKT
J203 OUTPUTTING 55B DET/AUDIO CKT
J204 (2ND MIXER, V2)
J205 INPUT FROM AUTO PHASE CONTROL CKT
J206
J207 (3RD MIXER, V4)
J208
J209
J210 455KC TO 3RDTR (NORMAL)
A (6.50 MC OSC, V7)
B (ISOLATION AMPL, V12)
-70V DC
CHANNEL OSCILLATORS
1ST OSC V13 6661
2ND OSC V14 6661
3RD OSC V15 6661
3RD OSC 332 KC
2ND OSC 832 KC
1ST OSC 832 KC
ANT/AUDIO TRANSFER RELAY SYSTEM
ANT-NORMAL RELAY
6.15MC OSC
NOTES
1. UNLESS OTHERWISE INDICATED: ALL RESISTORS ARE IN OHMS, ±5%, ½ WATT, ALL CAPACITORS ARE IN UUF, ALL INDUCTORS ARE IN UH.
2. WITH EXCEPTION OF JACKS AND PLUGS, REFERENCE DESIGNATIONS ARE ABBREVIATED. ADD 1000 TO REFERENCE NUMBERS, THAT IS, READ R1 AS R1201.
3. (TP) INDICATES TEST POINT AND IS NOT A REFERENCE DESIGNATION.
*4. CR1, CR2, CR3 ARE TEXAS INSTRUMENT DIODES NUMBER TI 622.

FIGURE 4.40 FREQUENCY CORRECTION UNIT

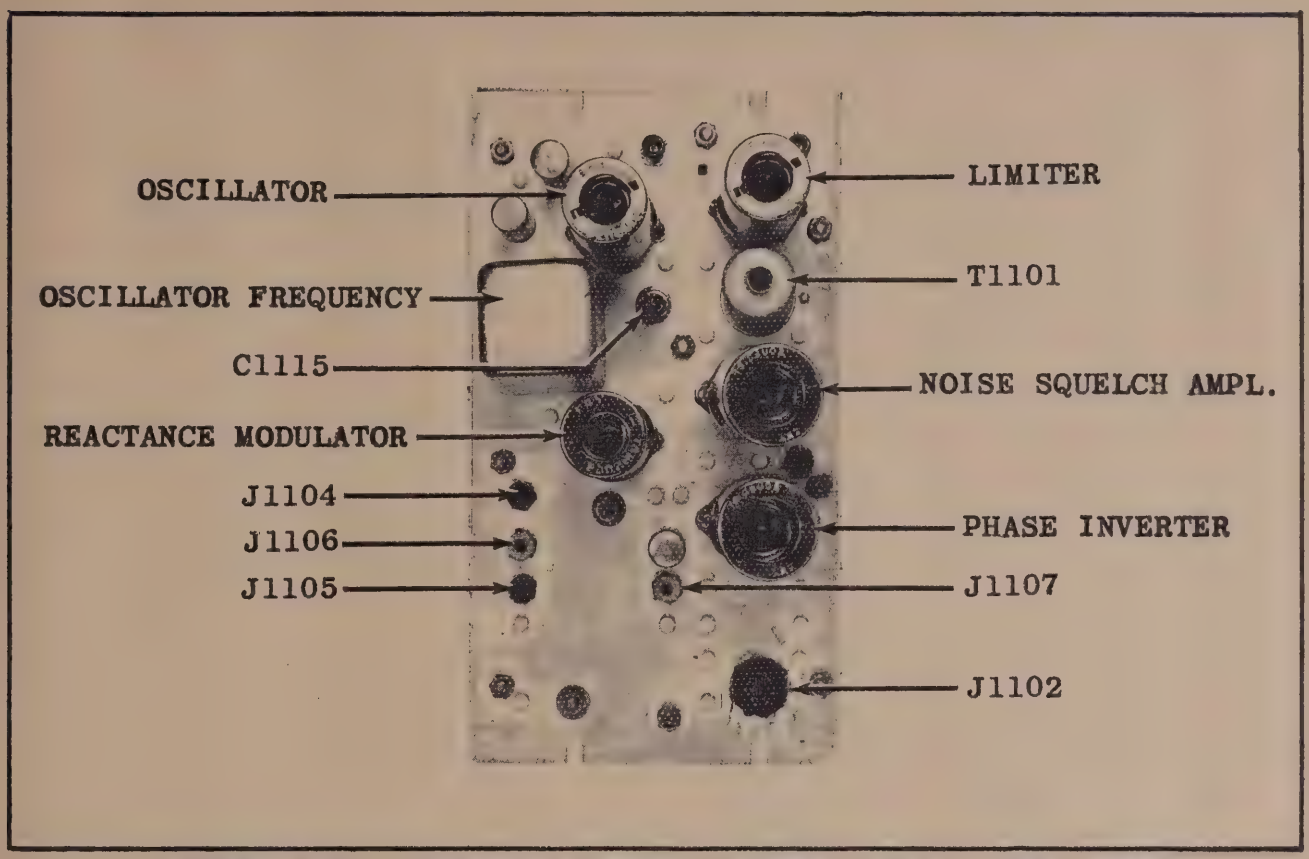


FIGURE 4.5A AUTOMATIC PHASE CONTROL UNIT (TOP VIEW)

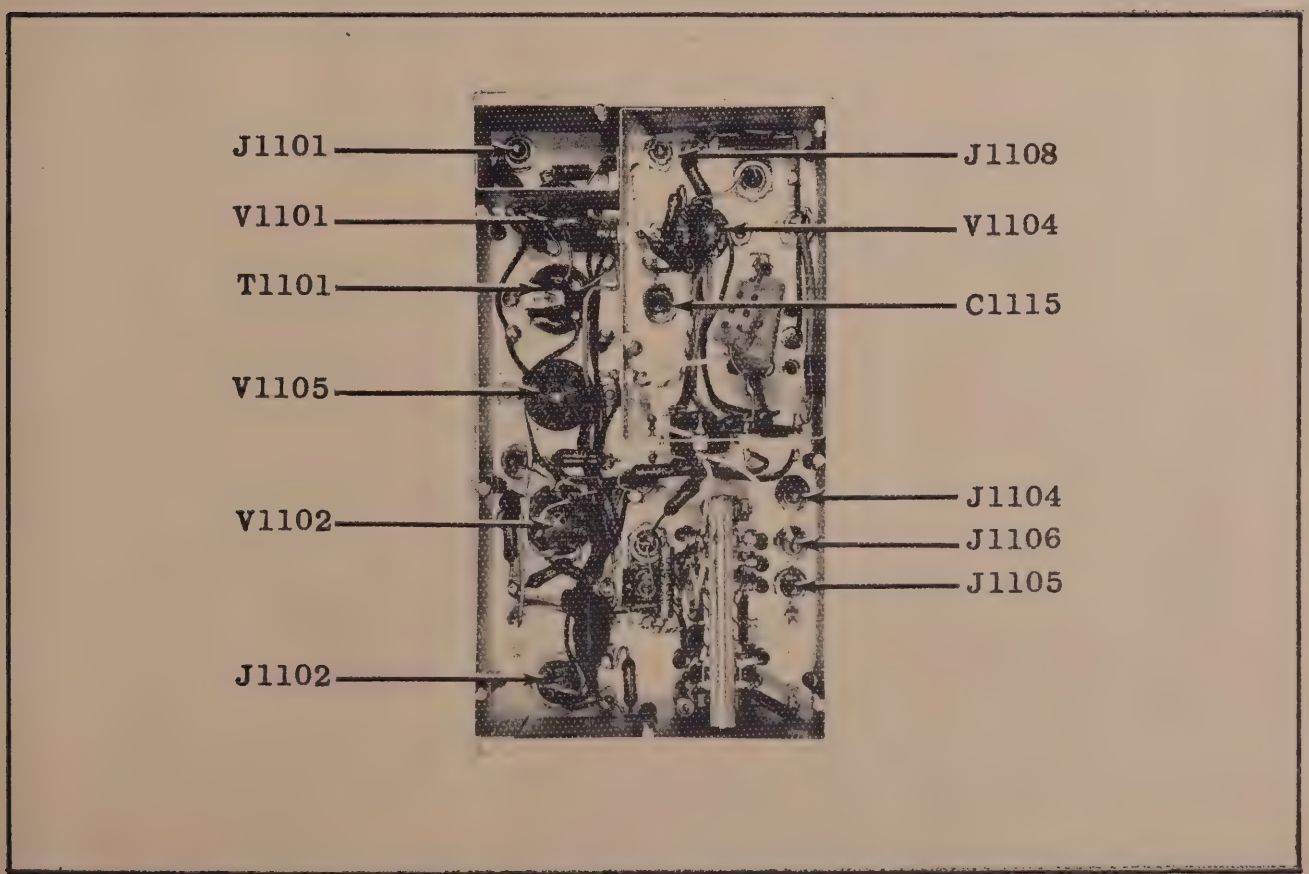
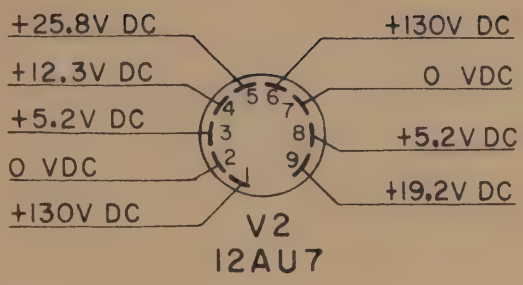
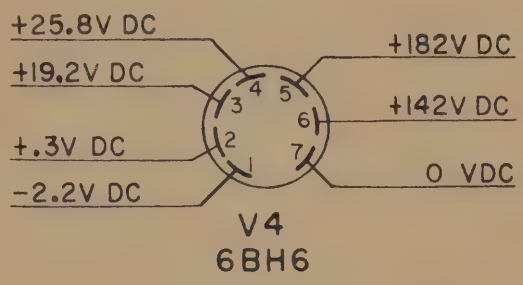


FIGURE 4.5B AUTOMATIC PHASE CONTROL UNIT (BOTTOM VIEW)



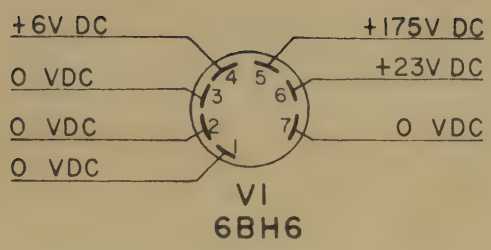
V2
12AU7

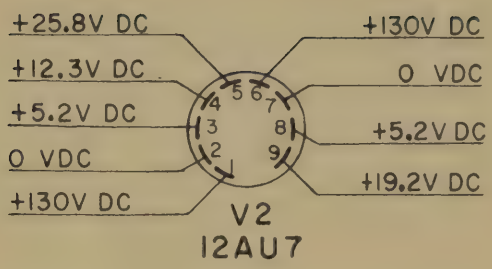


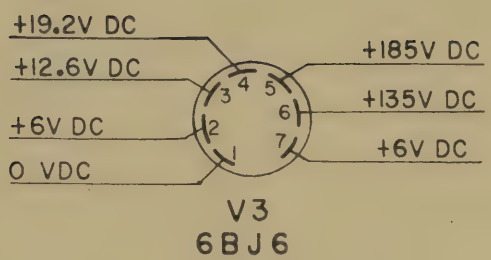
V4
6BH6

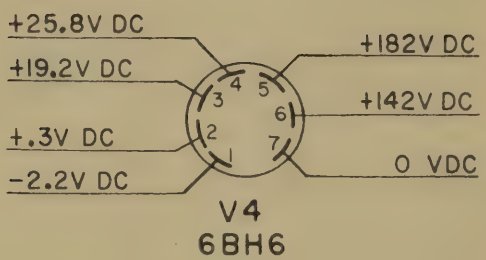
NOTES:
ALL VOLTAGES TO GROUND.
METER VTVM.

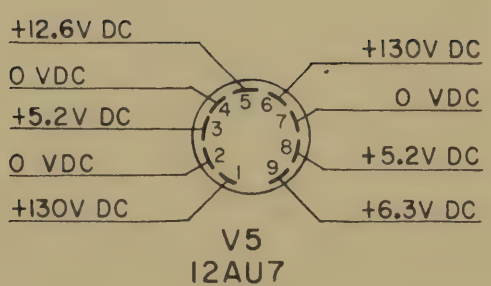
RT. AUTOMATIC PHASING CONTROL, RECEIVER.
IBER)





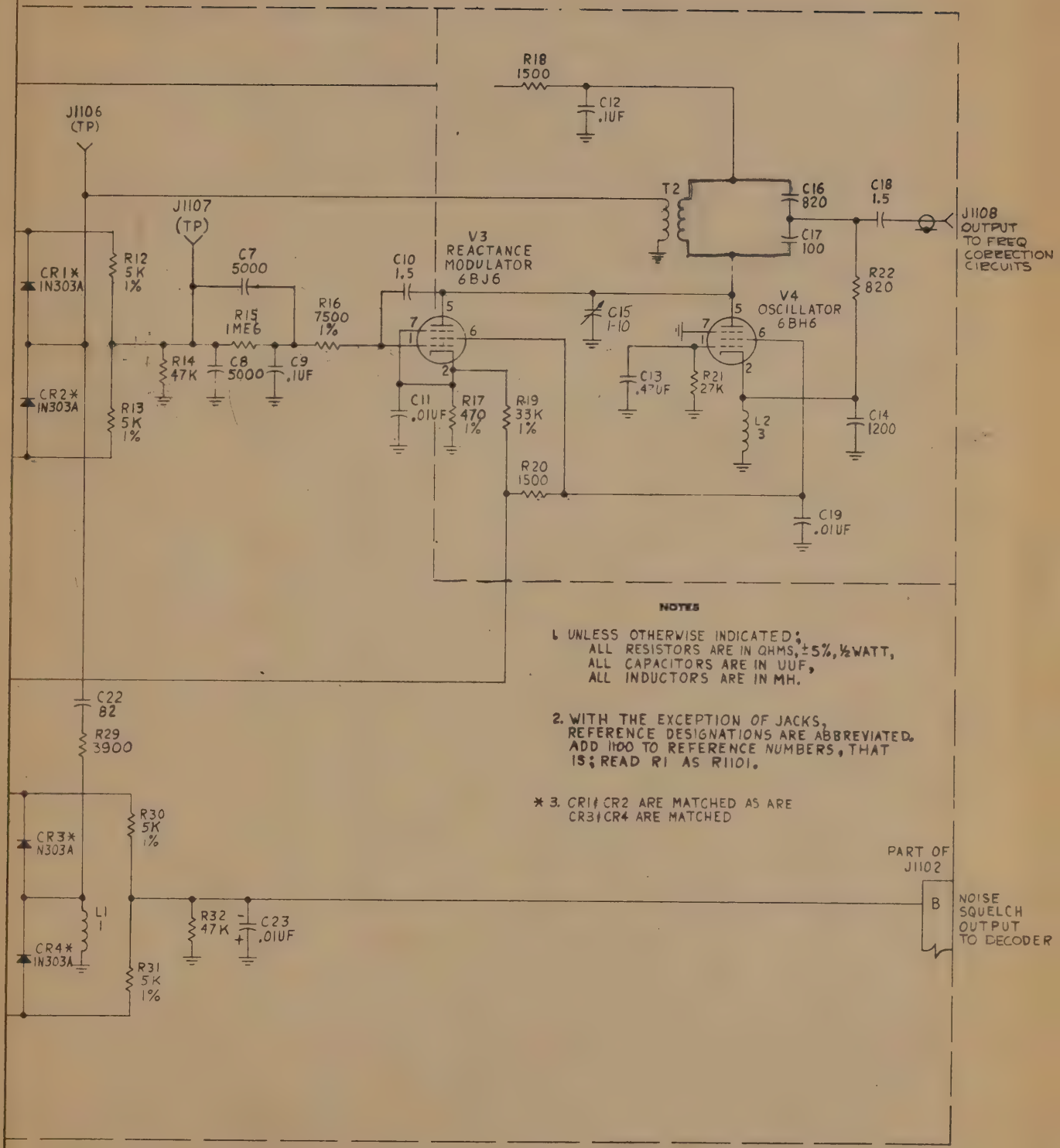






NOTES:
ALL VOLTAGES TO GROUND.
METER VTVM.

FIGURE 4.5C. TUBE SOCKET VOLTAGE CHART. AUTOMATIC PHASING CONTROL, RECEIVER. (SUBSCRIBER)



NOTES

1. UNLESS OTHERWISE INDICATED;
   ALL RESISTORS ARE IN OHMS, ±5%, ½WATT,
   ALL CAPACITORS ARE IN UUF,
   ALL INDUCTORS ARE IN MH.

2. WITH THE EXCEPTION OF JACKS, REFERENCE DESIGNATIONS ARE ABBREVIATED. ADD 1100 TO REFERENCE NUMBERS, THAT IS; READ R1 AS R1101.

* 3. CR1 & CR2 ARE MATCHED AS ARE CR3 & CR4 ARE MATCHED

FIGURE 4.5D AUTOMATIC PHASING CONTROL

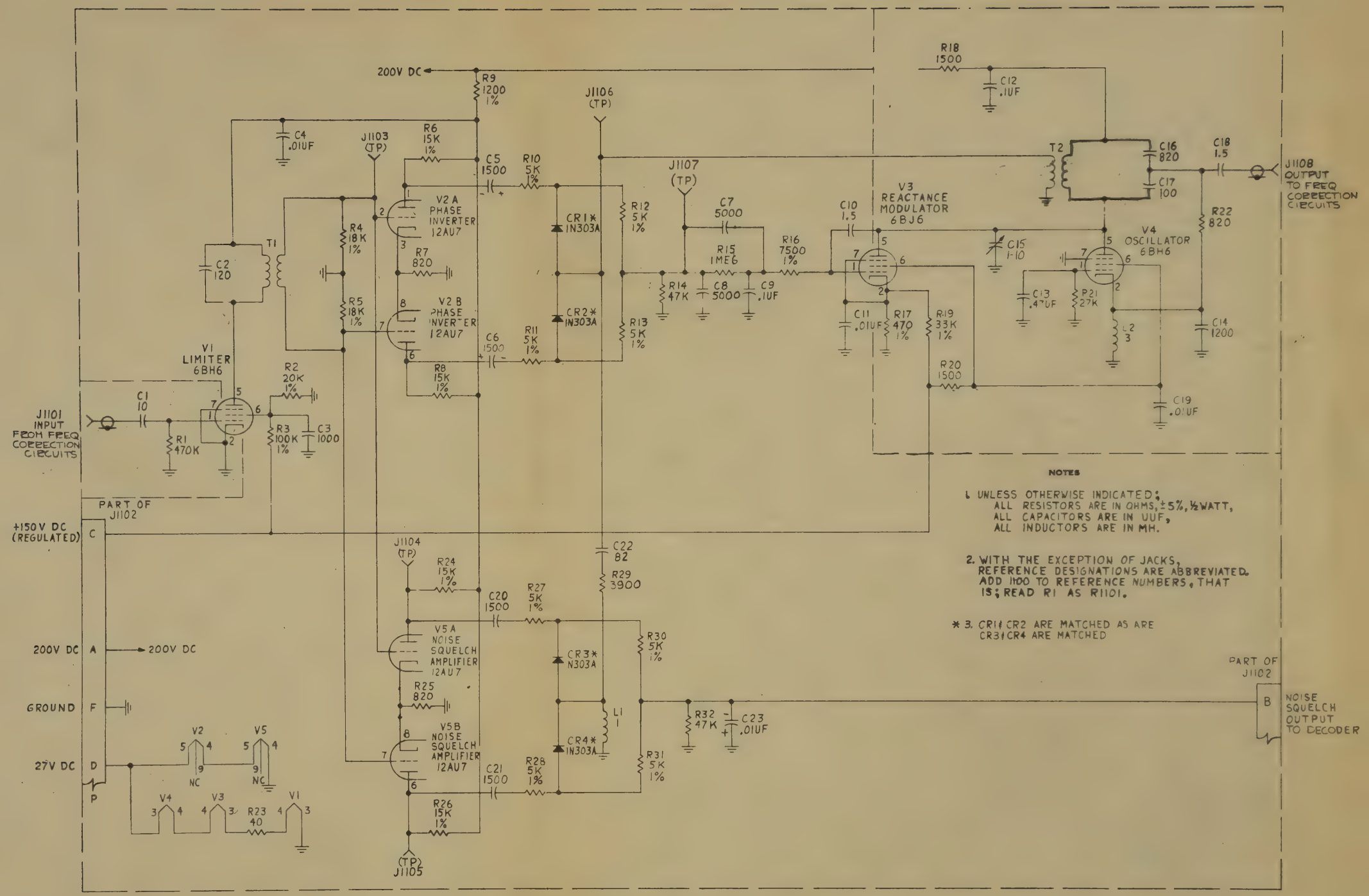


FIGURE 4.5D AUTOMATIC PHASING CONTROL

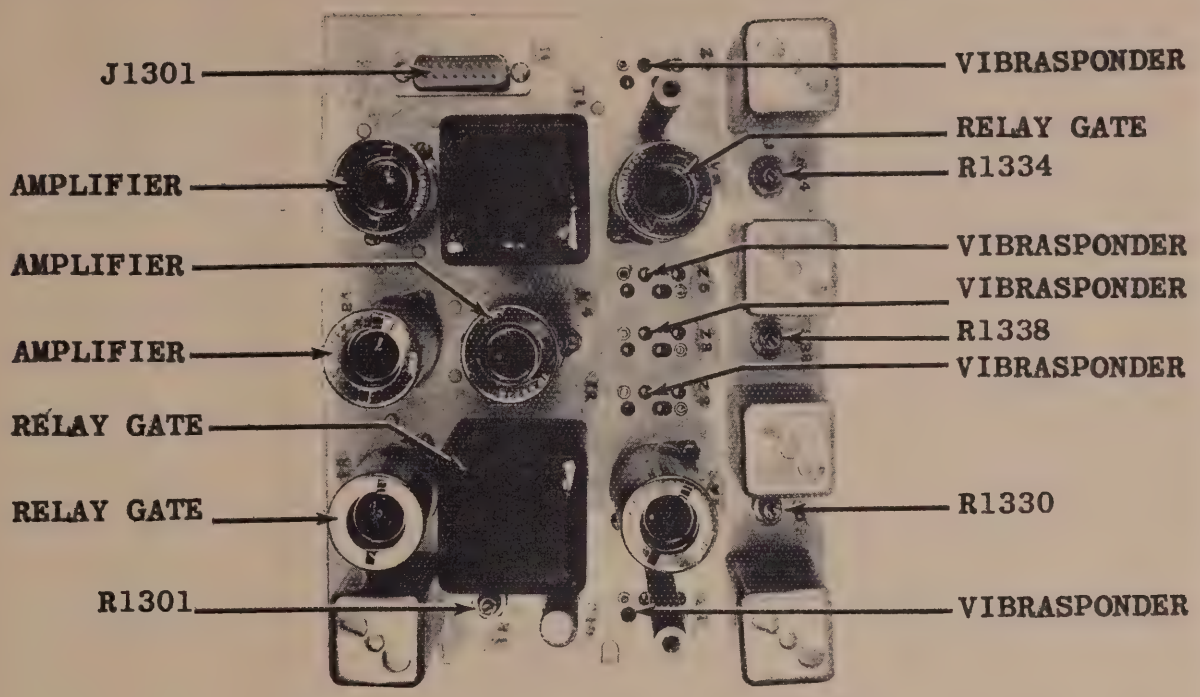


FIGURE 4.6A RECEIVER DECODER (TOP VIEW)

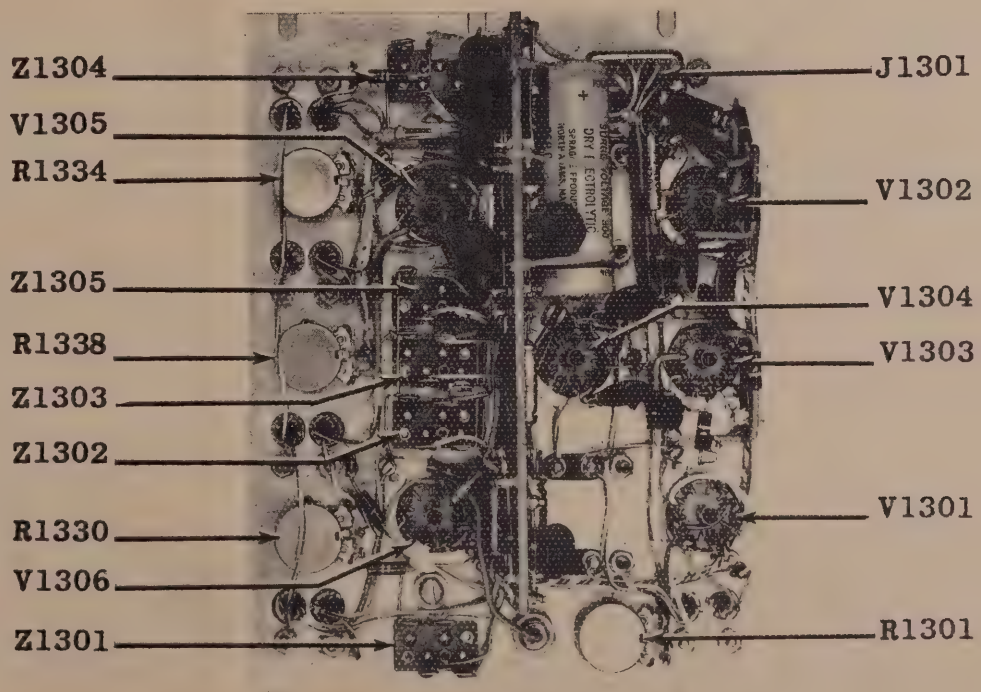
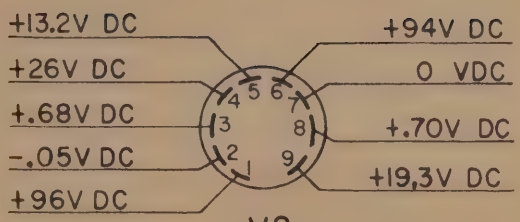
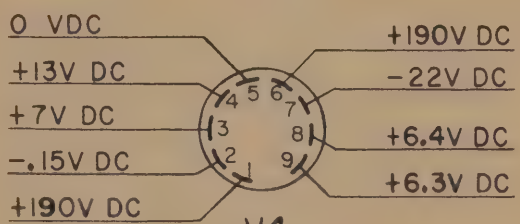


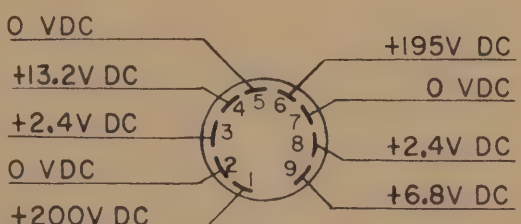
FIGURE 4.6B RECEIVER DECODER (BOTTOM VIEW)



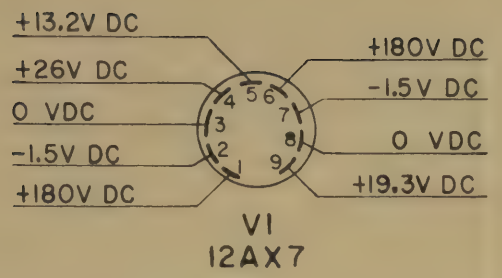
V2
12AX7



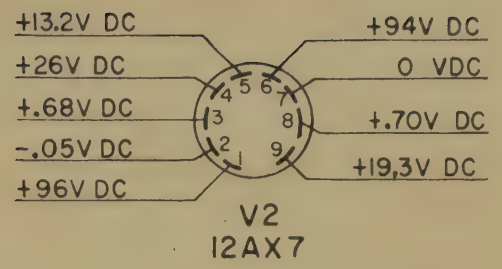
V4
12AU7



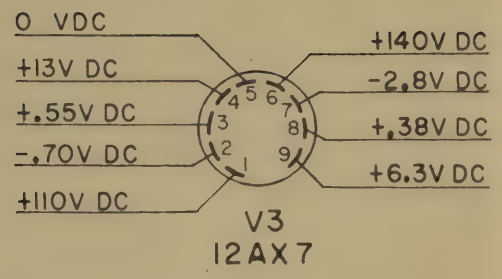
V6
12AX7



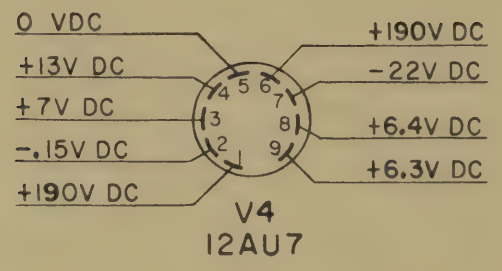
V1
12AX7



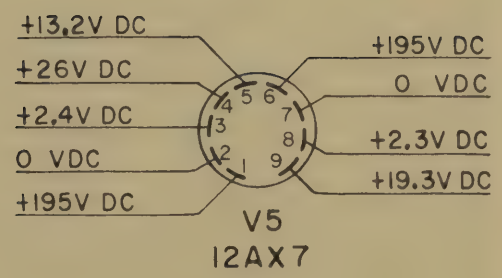
V2
12AX7



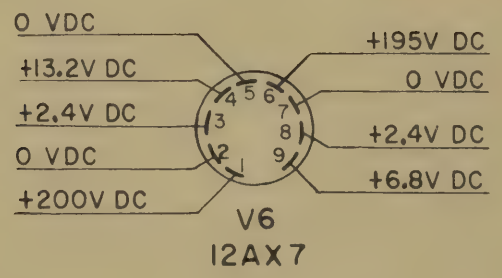
V3
12AX7



V4
12AU7



V5
12AX7



V6
12AX7

NOTES:
ALL VOLTAGES TO GROUND.
METER VTVM.

FIGURE 4.6C. TUBE SOCKET VOLTAGE CHART. RECEIVER DECODER. (SUBSCRIBER)

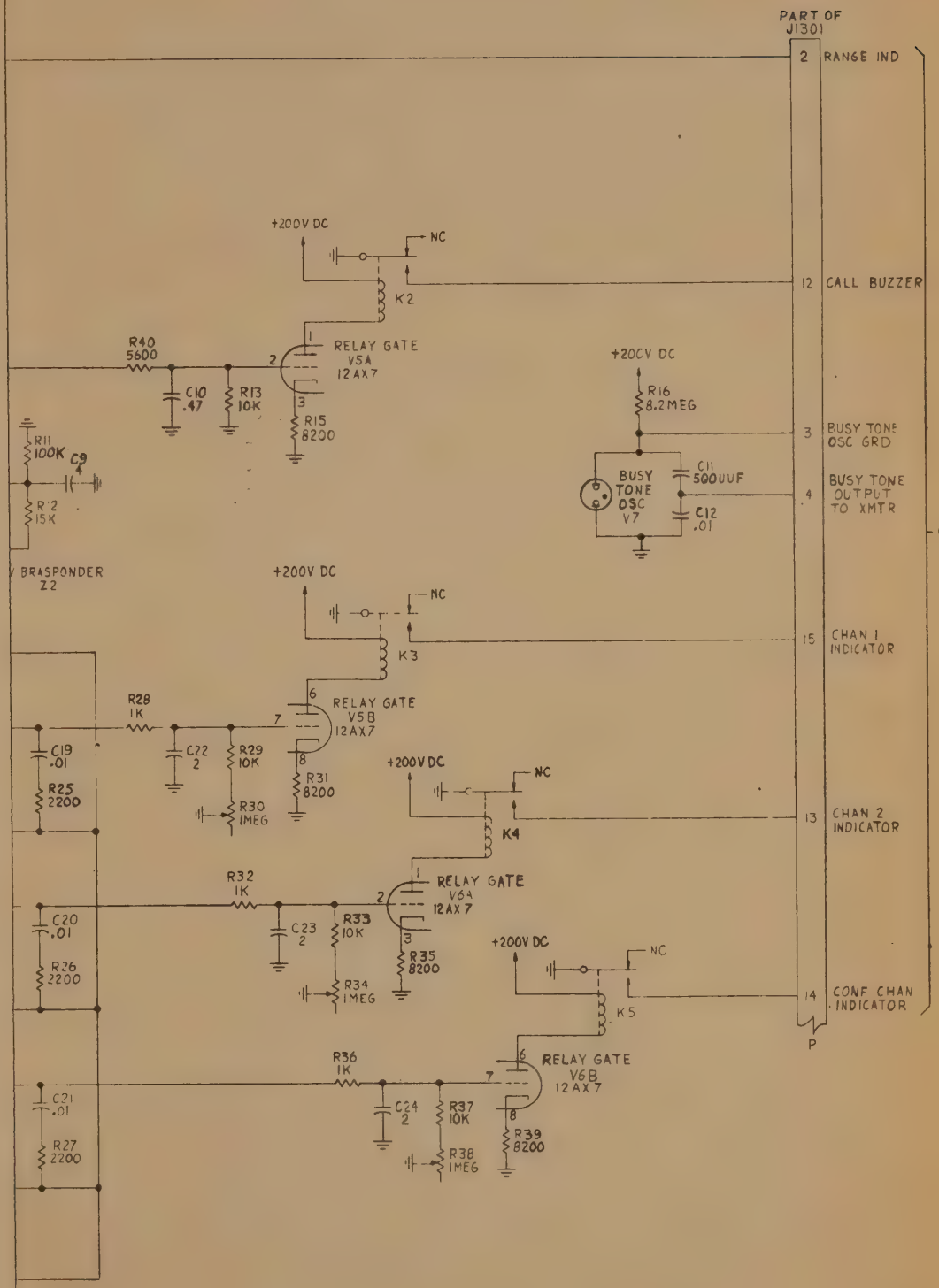


FIGURE 4.6D RECEIVER DECODER

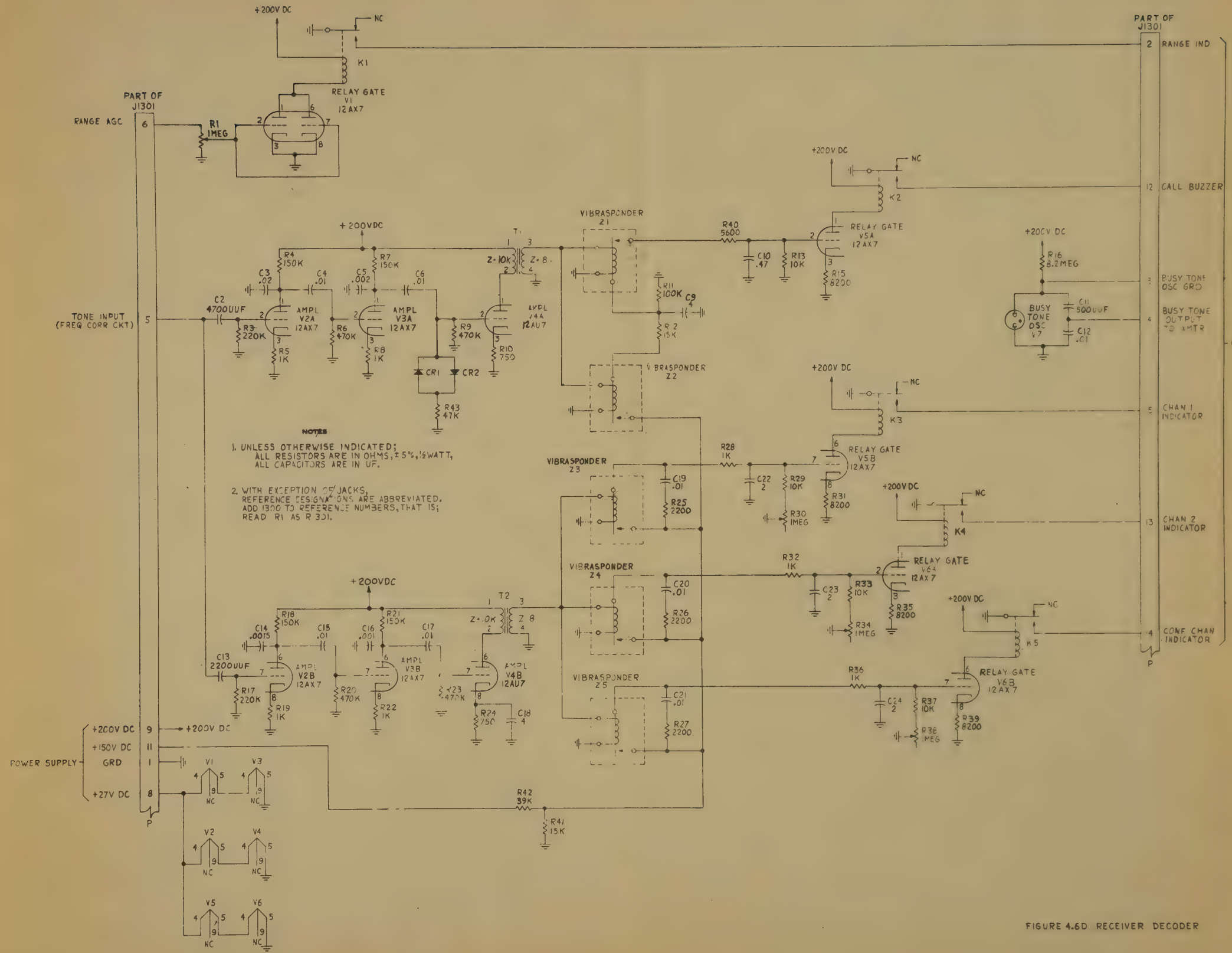


FIGURE 4.6D RECEIVER DECODER

34. Transmitting Cabinet. (Figures 4.7A, 4.7B and 4.7C).

a. The 4.7A and B figures display the units and their location in the transmitter cabinet. Figure 4.7C displays the circuits connecting these units.

b. The voice frequencies are fed into the SSB generator unit. The output of the SSB generator is fed through the RF oscillators, mixers and drivers unit to the Power Amplifier unit. The NET output is delivered to a co-axial relay in the receiver. The NORMAL output is delivered to the transmitting antenna.

c. Circuits common to all units are provided from J2001.

35. Single Sideband Generator. (Figures 4.8A, 4.8B, 4.8C and 4.8D).

a. Figures 4.8A and 4.8B call-out major components, tubes by function and points of adjustment.

b. Figure 4.8C displays the tube socket voltages. (Antenna disconnected).

c. Refer to figure 4.8D. The 438KC carrier is developed in the oscillator (VI), amplified in V2 and presented to the balanced modulator V3. The carrier is taken off the second cathode of V2 and re-inserted in the cathode of V4. The audio input is combined with carrier at the input to FLI. The modulated signal and the carrier are re-combined in V4.

d. Common circuitry is provided from J2101.

36. RF, Oscillators, Mixers and Drivers Unit. (Figures 4.9A, 4.9B, 4.9C and 4.9D).

a. Figures 4.9A and 4.9B call-out the subchassis, tubes, adjustments and major components of this unit.

b. Figure 4.9C displays the tube socket voltages. (Antenna disconnected).

c. Refer to figure 4.9D. During NORMAL operation of the

equipment, the SSB signal is combined with the receiver 6.256MC to 6.304MC signal in mixer V4. This signal passes through filter FL1 and is combined with a 9.891MC signal in mixer V6. The resultant 16MC signal is combined with a 149.67MC signal in mixer V8. The resultant 166MC signal is amplified and passed to the Power Amplifier unit.

d. During NET operation, the SSB signal is combined with a 6.27MC signal in mixer V4. This signal passes through filter FL1 and amplifier V7 to mixer V13. In V13 the signal is combined with a 149.67MC signal and the resultant 156MC signal is amplified and passed to the Power Amplifier unit.

e. Common circuitry is provided from J2301.

37. Power Amplifier Unit. (Figures 4.10A, 4.10B, 4.10C and 4.10D).

a. Figures 4.10A and 4.10B call-out the tube designations and adjustment points.

b. Figure 4.10C displays the tube socket voltages. (Antenna disconnected).

c. Figure 4.10D is the schematic diagram.

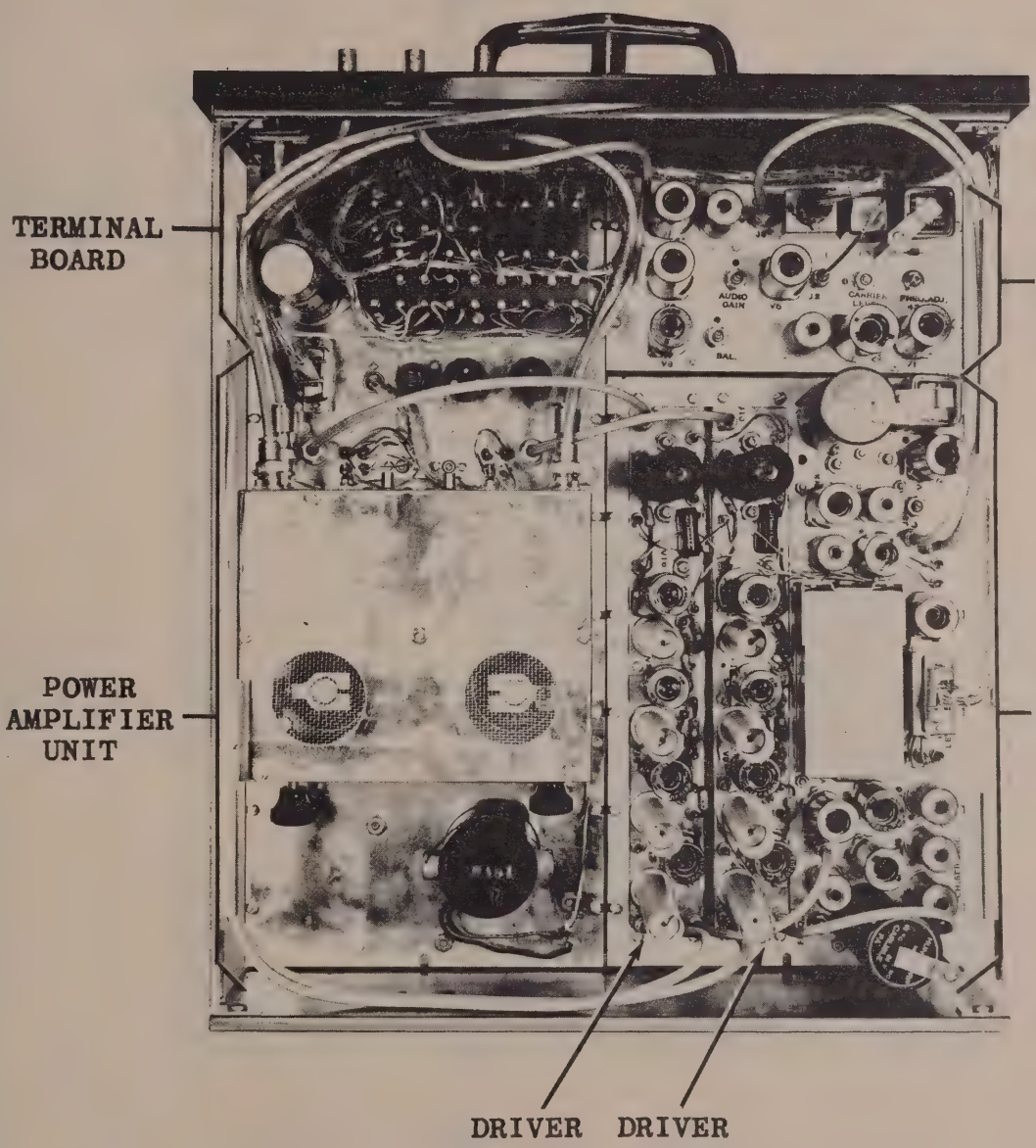


FIGURE 4.7A TRANSMITTER CABINET (TOP VIEW)

FIGURE 4.7B TRANSMITTER CABINET (BOTTOM VIEW)

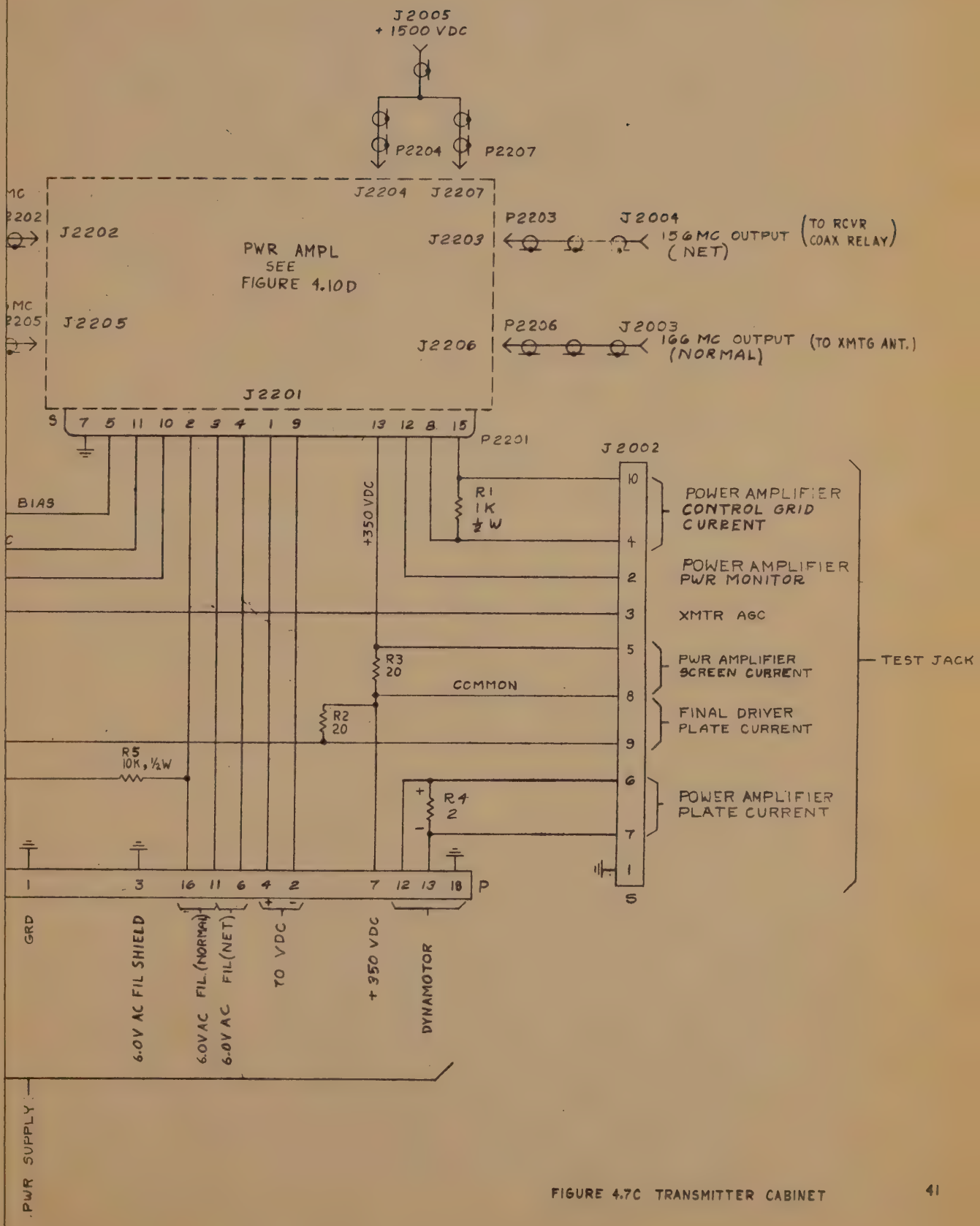


FIGURE 4.7C TRANSMITTER CABINET

NOTES

1. UNLESS OTHERWISE INDICATED; ALL RESISTORS ARE IN OHMS ±1%, ½ WATT
2. WITH EXCEPTION OF JACKS AND PLUGS, REFERENCE DESIGNATIONS ARE ABBREVIATED. ADD 2000 TO REFERENCE NUMBERS, THAT IS; READ R1 AS R2001

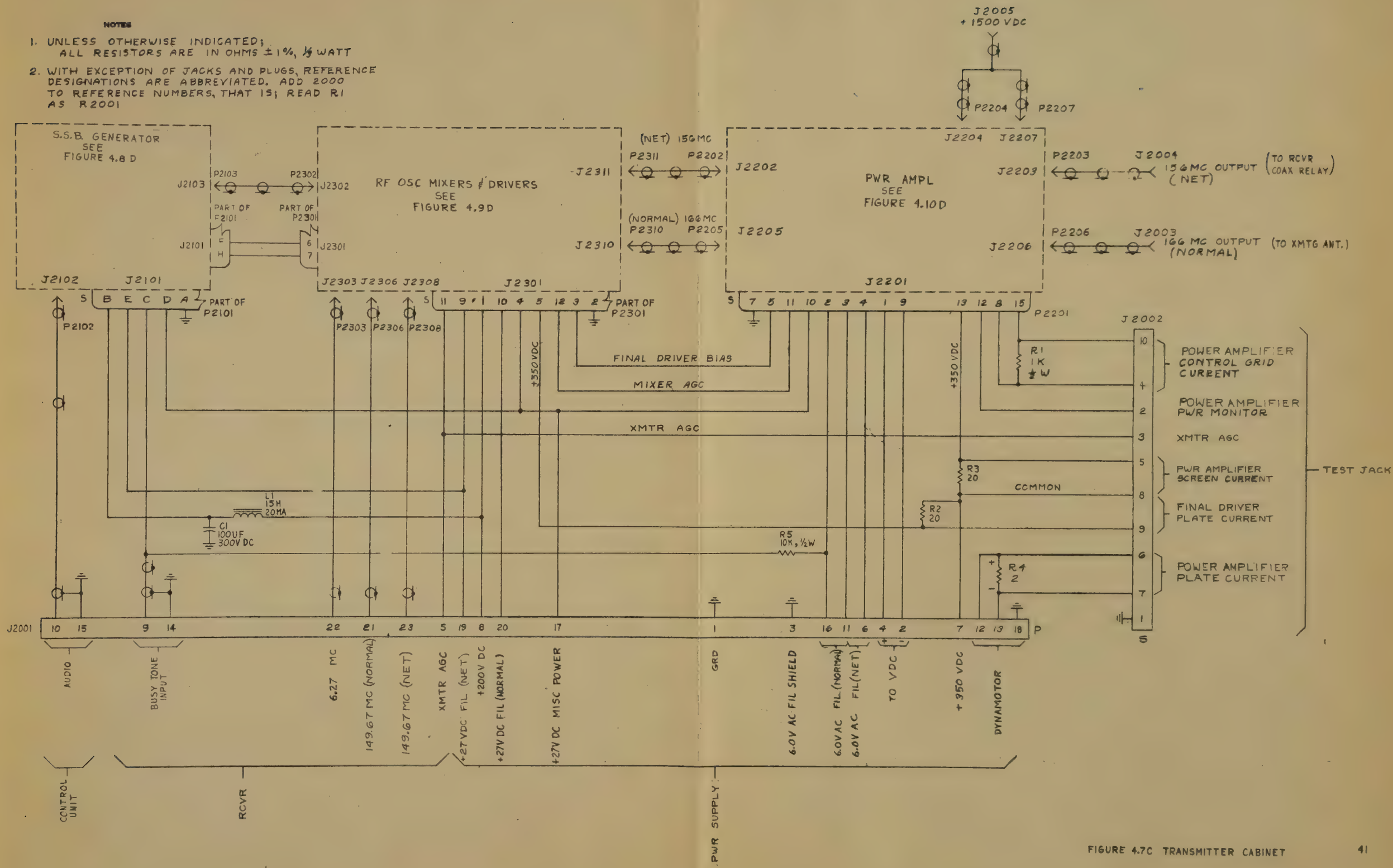


FIGURE 4.7C TRANSMITTER CABINET

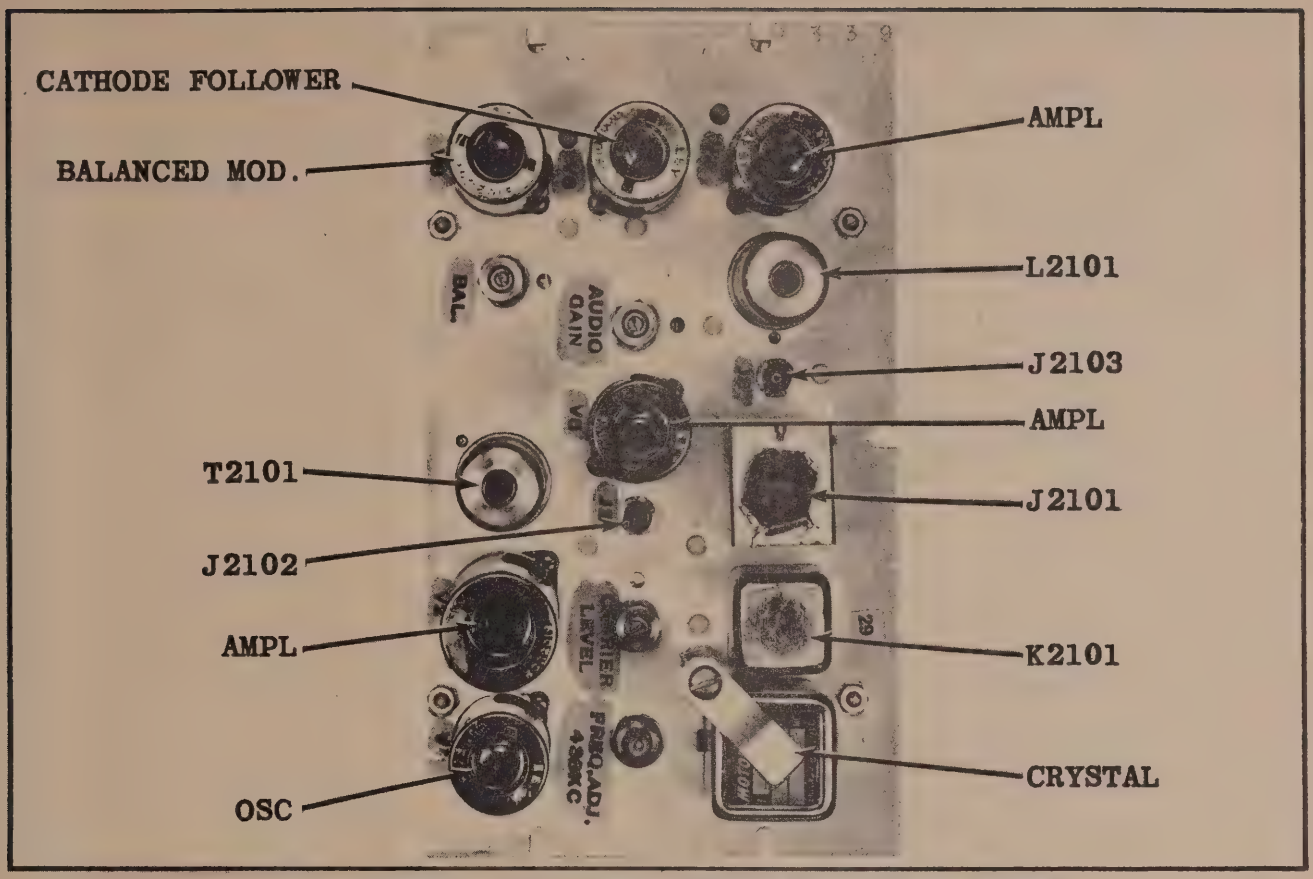


FIGURE 4.8A SSB GENERATOR (TOP VIEW)

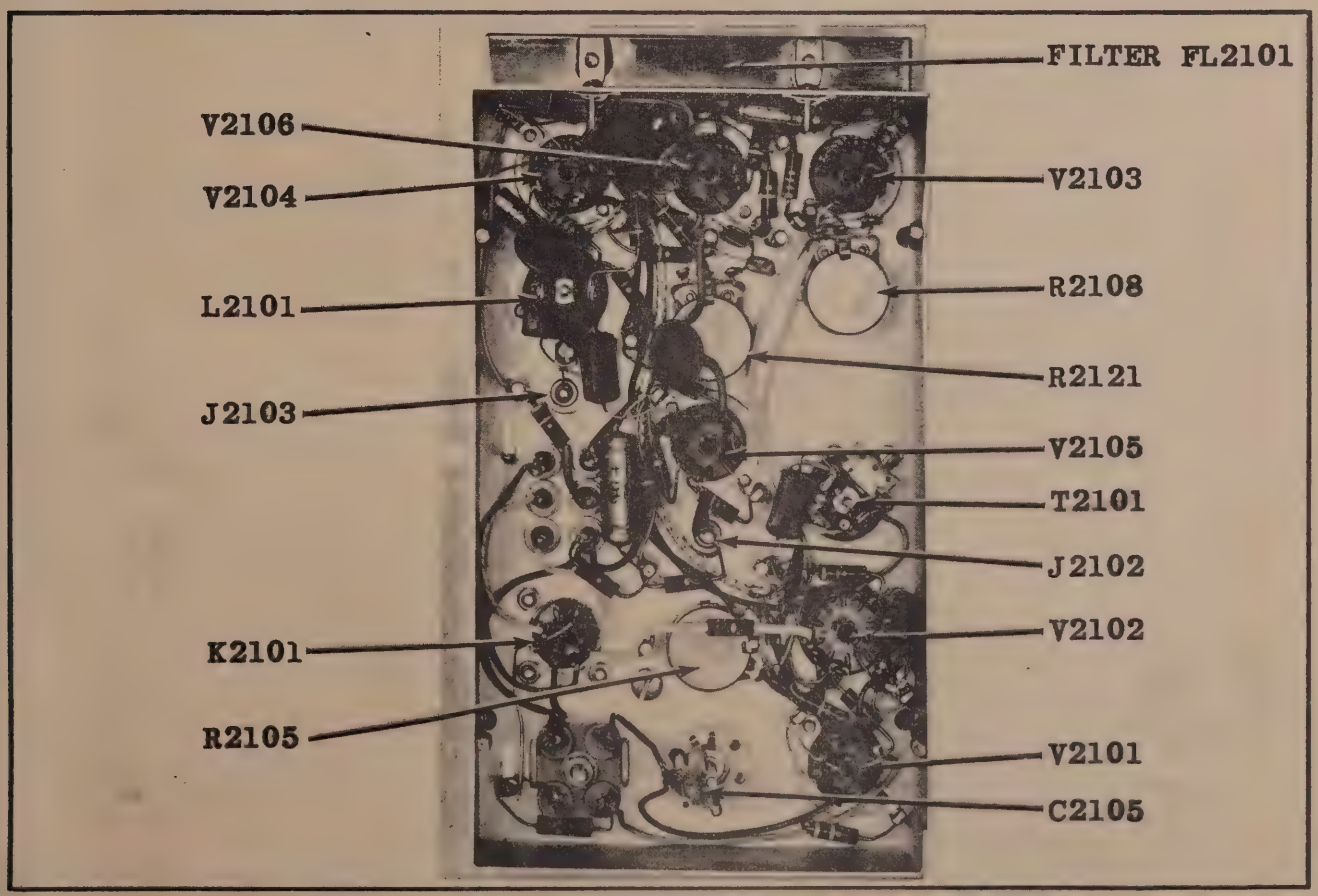
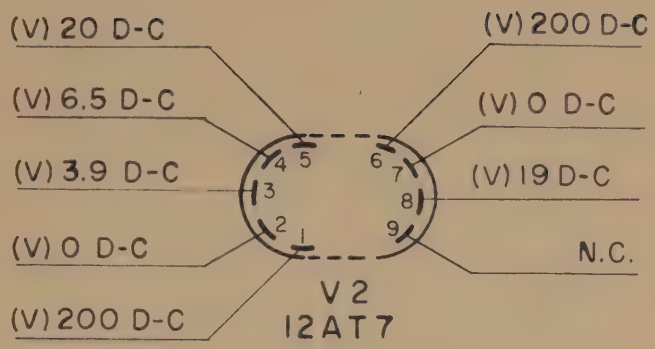
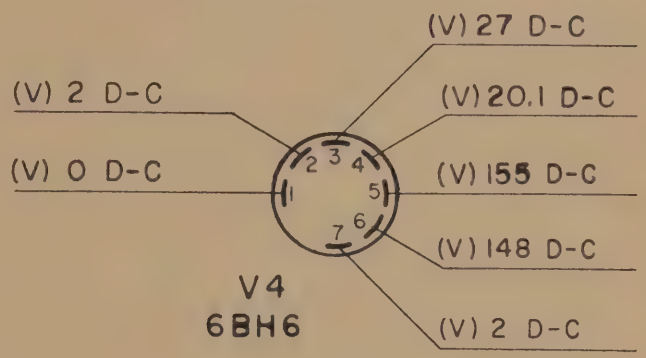
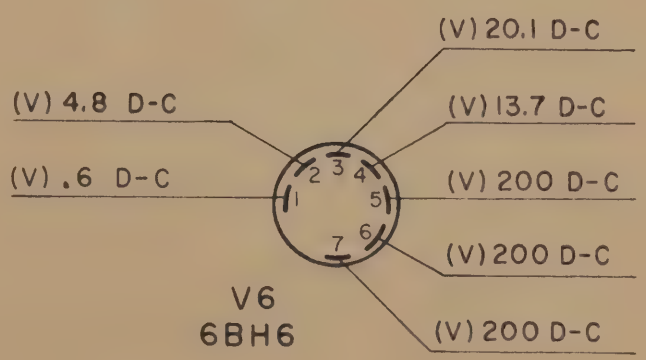


FIGURE 4.8B SSB GENERATOR (BOTTOM VIEW)







SIDEBAND PUT

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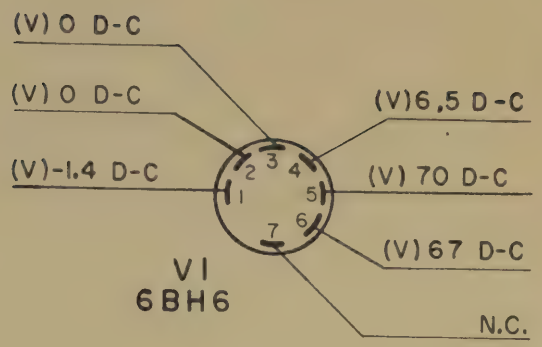
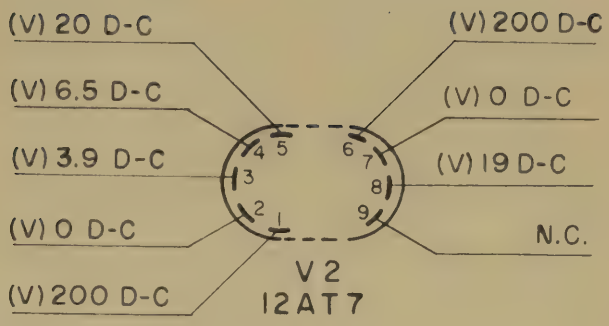
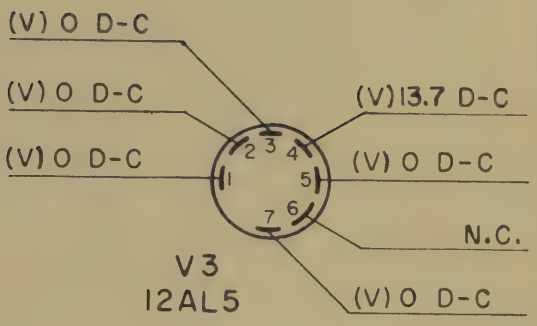
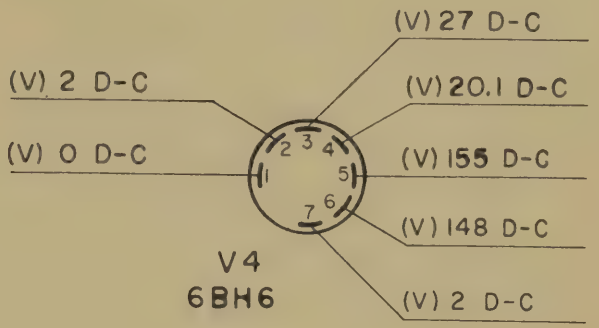
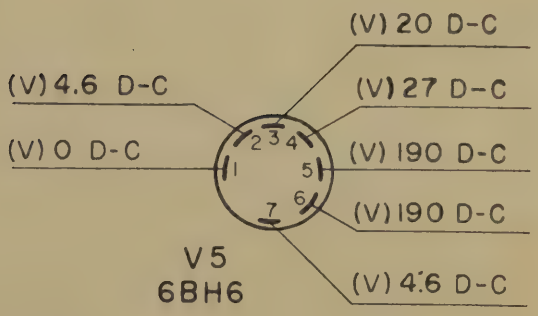
ART. SINGLE SIDEBAND GENERATOR (SUBSCRIBER)

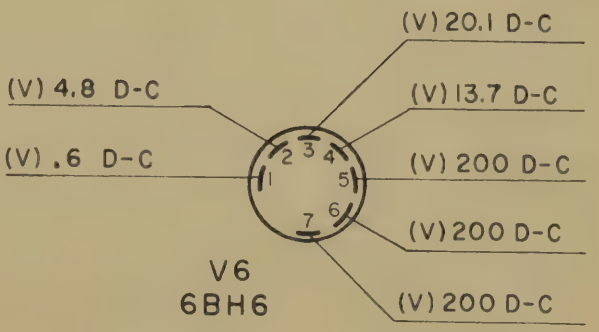












NOTES:

ALL VOLTAGES TO GROUND.
METER 20,000 OHMS PER VOLT.

FIGURE 4.8C. TUBE SOCKET VOLTAGE CHART. SINGLE SIDEBAND GENERATOR (SUBSCRIBER)

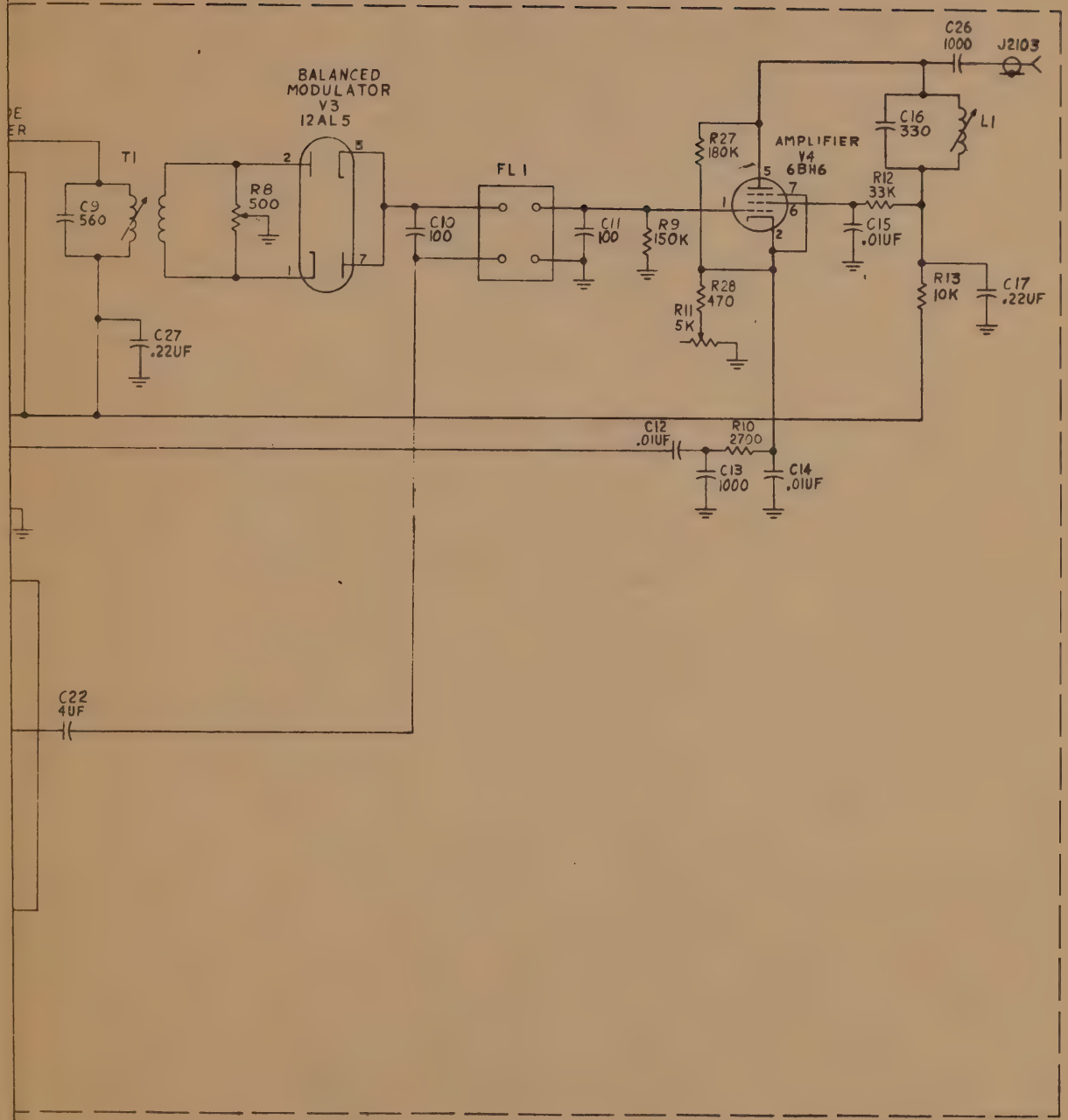


FIGURE 4.8D SINGLE SIDE BAND GENERATOR

NOTES

1. UNLESS OTHERWISE INDICATED;
   ALL RESISTORS ARE IN OHMS
   ALL CAPACITORS ARE IN UUF.

2. WITH EXCEPTION OF JACKS, REFERENCE DESIGNATIONS ARE ABBREVIATED. ADD 2100 TO REFERENCE NUMBERS, THAT IS; READ R1 AS R2101.

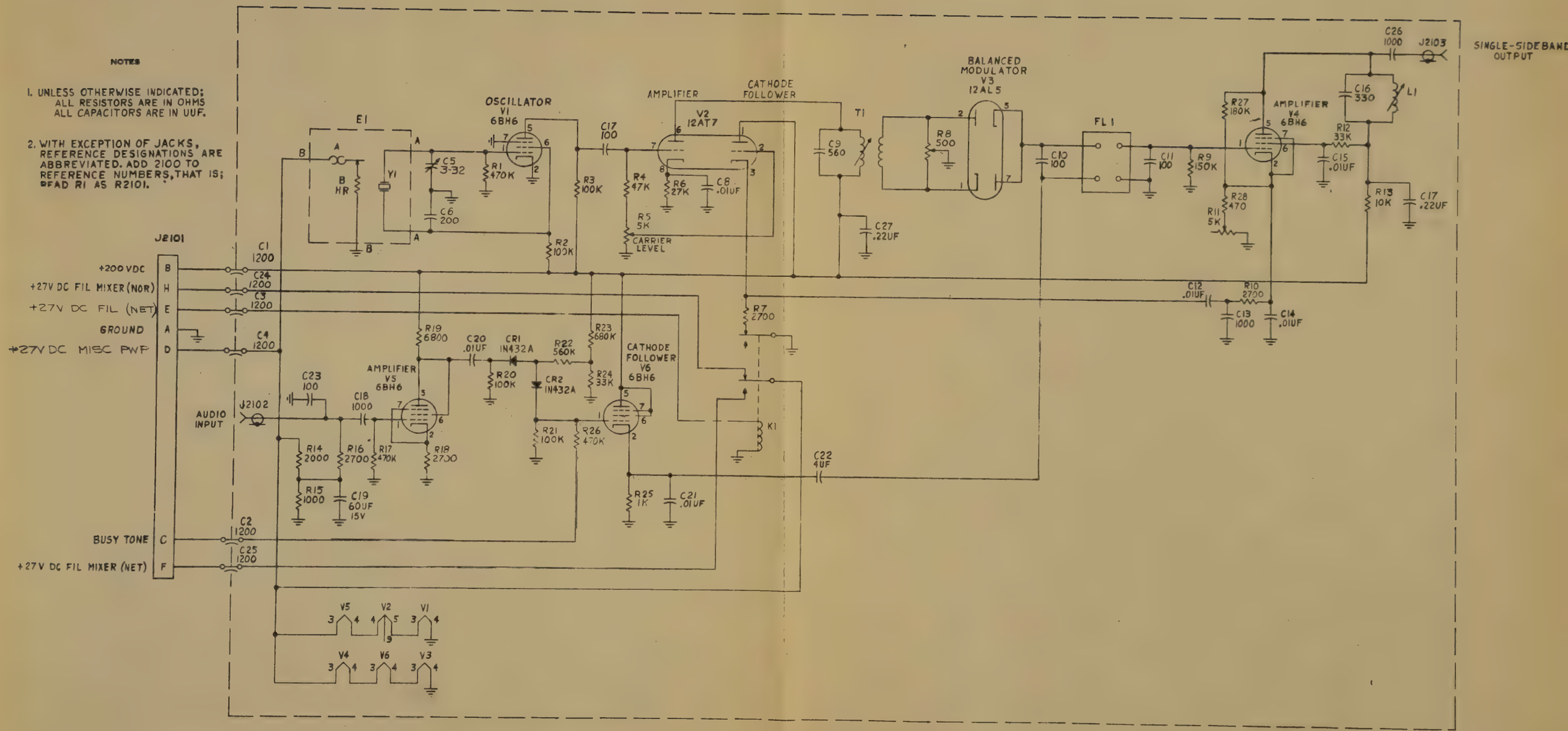


FIGURE 4.8D SINGLE SIDE BAND GENERATOR

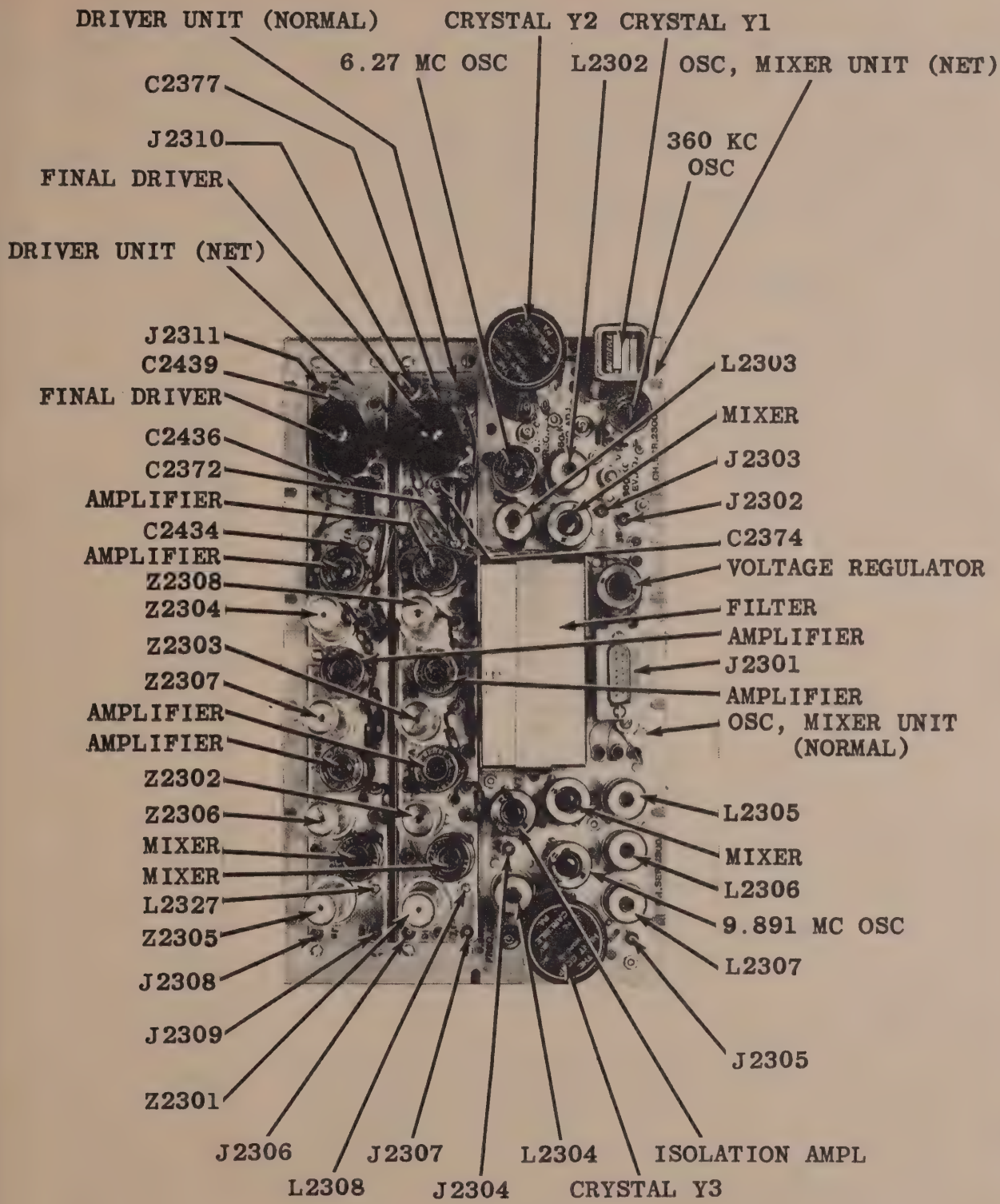


FIGURE 4.9A OSC, MIXER, DRIVER (TOP VIEW)

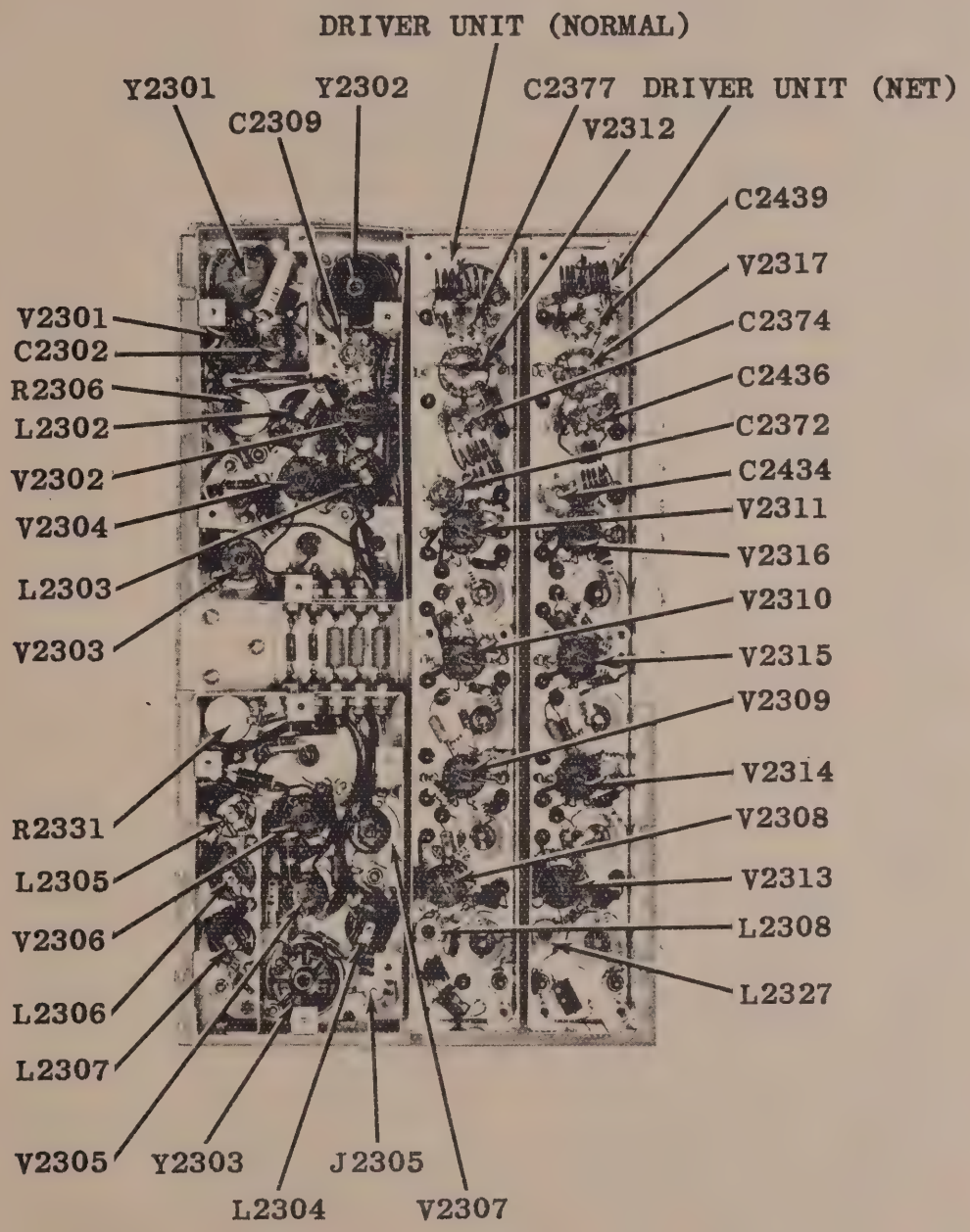
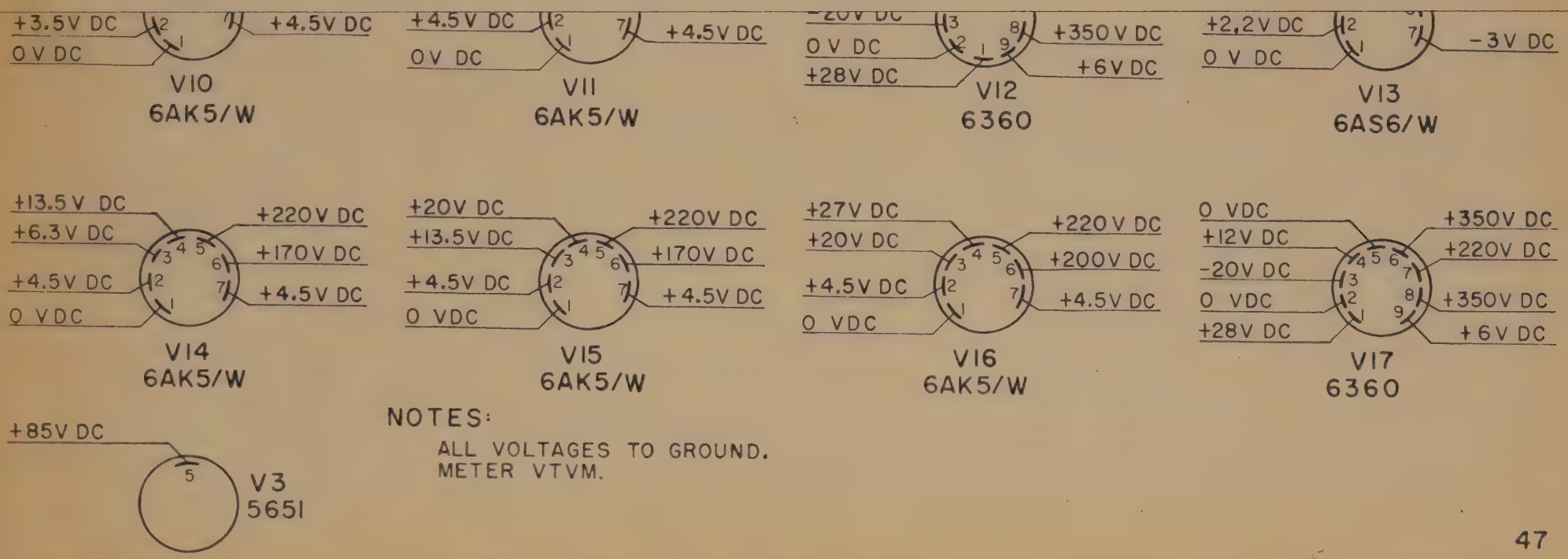


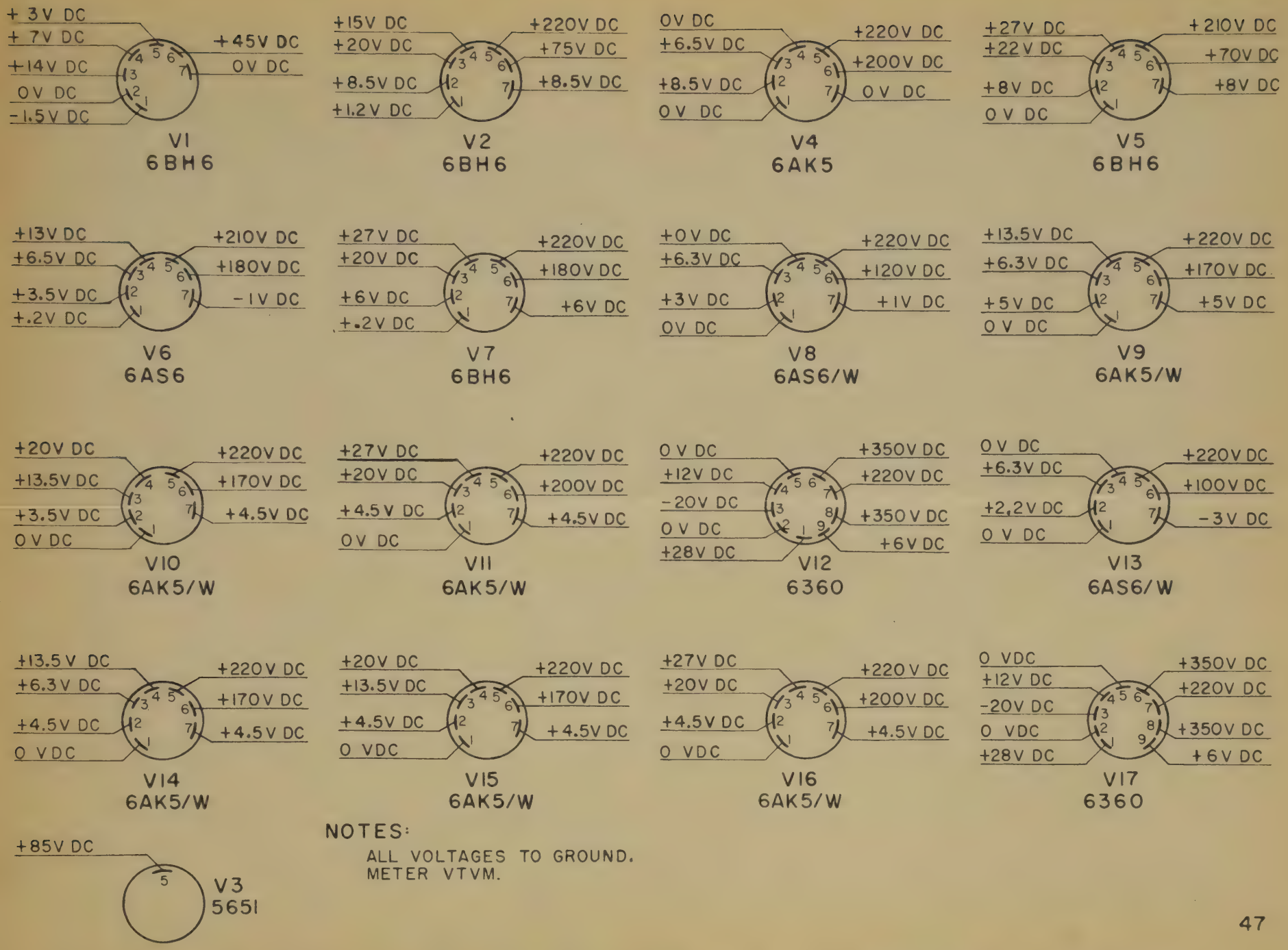
FIGURE 4.9B OSC, MIXER, DRIVER (BOTTOM VIEW)



NOTES:

ALL VOLTAGES TO GROUND.
METER VTVM.

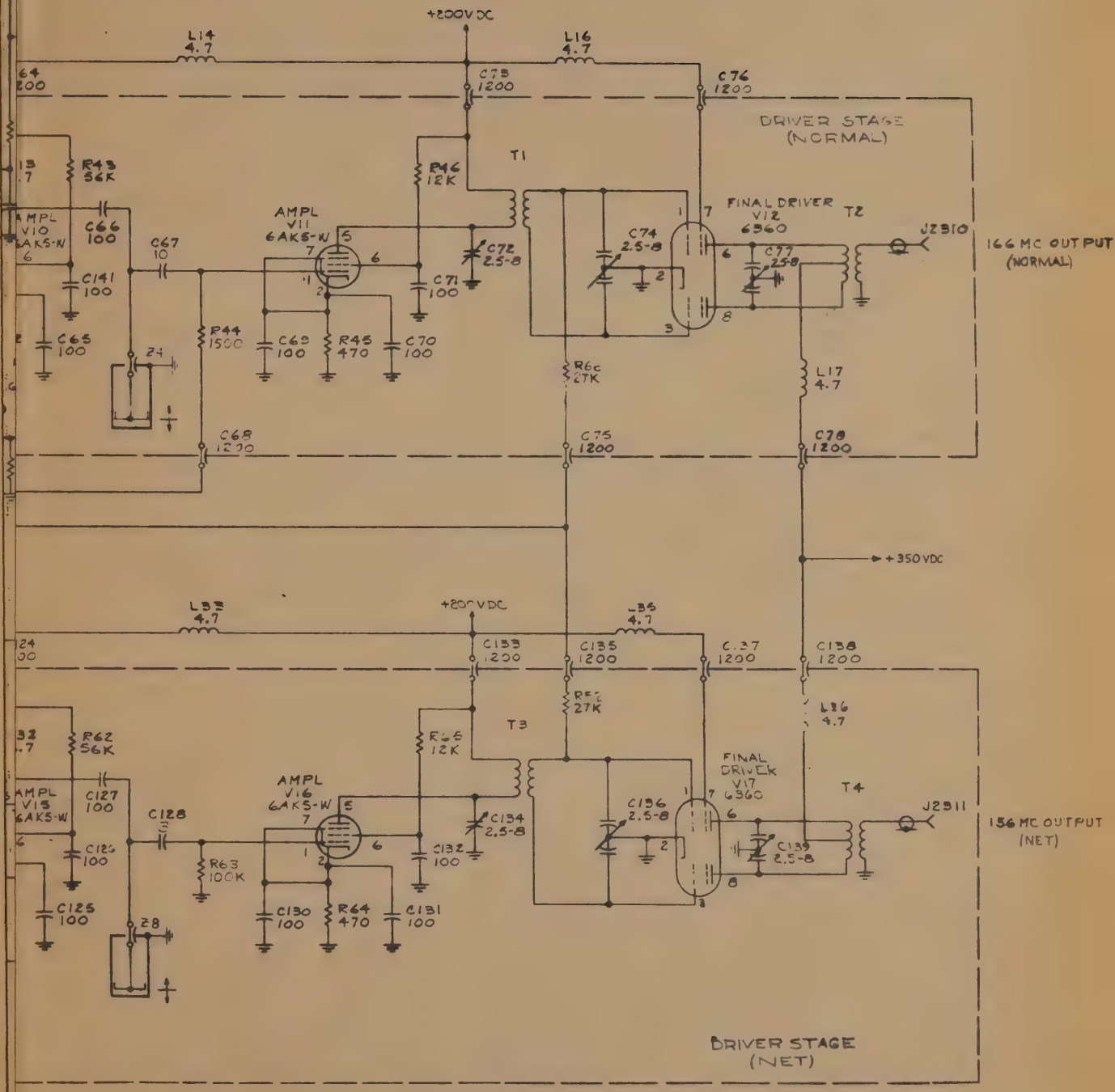
FIGURE 4.9C. TUBE SOCKET VOLTAGE CHART. OSCILLATOR, MIXER, DRIVER. TRANSMITTER. (SUBSCRIBER)

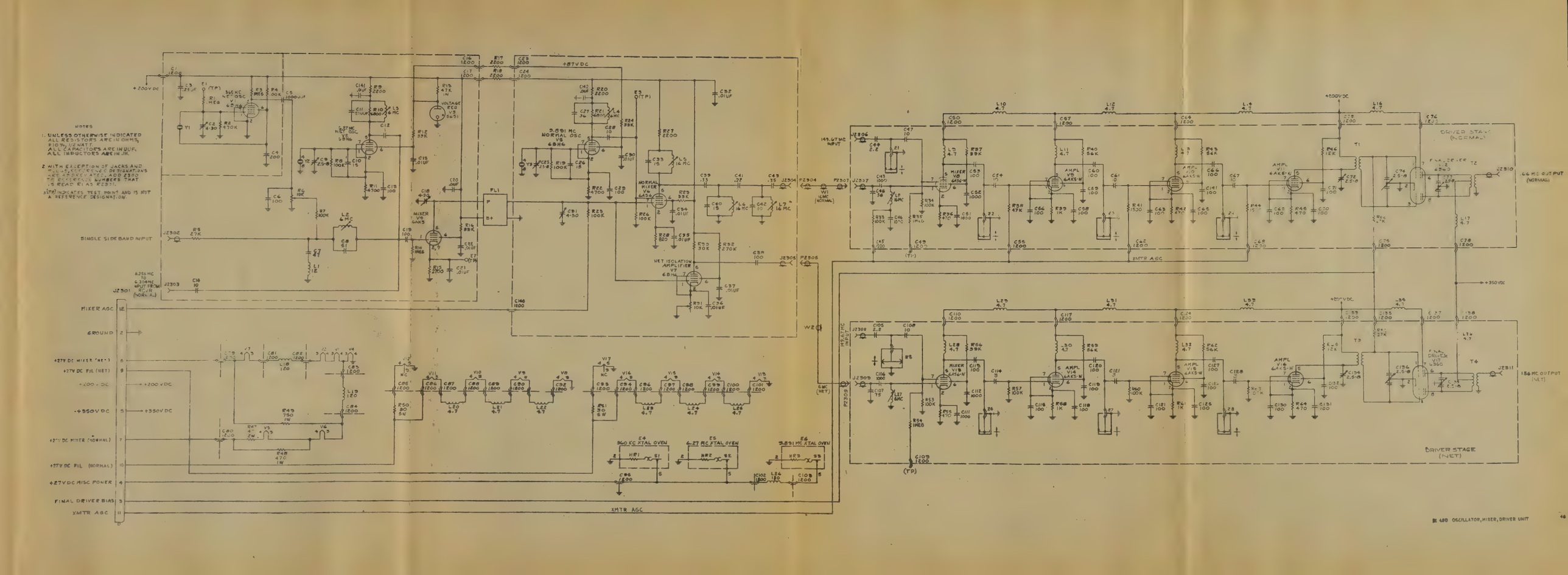


NOTES:

ALL VOLTAGES TO GROUND.
METER VTVM.

FIGURE 4.9C. TUBE SOCKET VOLTAGE CHART. OSCILLATOR, MIXER, DRIVER. TRANSMITTER. (SUBSCRIBER)


+200VDC
L14 4.7
L16 4.7
C73 1200
C76 1200
DRIVER STAGE (NORMAL)
T1
R43 56K
R46 12K
AMPL V10 6AK5-W
C66 100
C67 10
AMPL V11 6AK5-W
C72 2.5-8
C74 2.5-8
FINAL DRIVER V12 6360
T2
J2310
166 MC OUTPUT (NORMAL)
C77 2.5-8
C141 100
C71 100
C65 100
R44 1500
C69 100
R45 470
C70 100
Z4
R66 27K
L17 4.7
C68 1200
C75 1200
C78 1200
+350VDC
L33 4.7
+200VDC
L35 4.7
C133 1200
C135 1200
C137 1200
C138 1200
R62 56K
T3
R65 12K
L36 4.7
AMPL V15 6AK5-W
C127 100
C128 3
AMPL V16 6AK5-W
C134 2.5-8
C136 2.5-8
FINAL DRIVER V17 6360
T4
J2311
156 MC OUTPUT (NET)
C126 100
R63 100K
C132 100
C139 2.5-8
C125 100
C130 100
R64 470
C131 100
Z8
DRIVER STAGE (NET)


NOTES
1. UNLESS OTHERWISE INDICATED ALL RESISTORS ARE IN OHMS, 10% (+) WATT. ALL CAPACITORS ARE IN UUF. ALL INDUCTORS ARE IN UH.
2. WITH EXCEPTION OF JACKS AND METER REFERENCE DESIGNATIONS ARE ARBITRARILY ADD 2300 TO SCHEMATIC NUMBERS THAT IS READ AS R231.
(TP) INDICATES TEST POINT AND IS NOT A REFERENCE DESIGNATION.
+200V DC
+87VDC
+350VDC
SINGLE SIDE BAND INPUT
6.250 MC TO 6.304MC INPUT FROM RCVR (NORMAL)
149.67 MC INPUT
(NORMAL)
(NET)
MIXER AGC
GROUND
+27V DC MIXER (NET)
+27V DC FIL (NET)
+200 V DC
+350V DC
+27V DC MIXER (NORMAL)
+27V DC FIL (NORMAL)
+27V DC MISC POWER
FINAL DRIVER BIAS
XMTR AGC
VOLTAGE REG V3 5651
3.5MC NET OSC V5 6BH6
3.5MC NORMAL OSC V5 6BH6
9.0091 MC NORMAL OSC V6 6BH6
MIXER V8 6AK5
NORMAL MIXER V4 6AS6
NET ISOLATION AMPLIFIER V7 6BH6
MIXER V8 6AS6-W
AMPL V9 6AK5-W
AMPL V10 6AK5-W
AMPL V11 6AK5-W
AMPL V12 6AK5-W
AMPL V13 6AK5-W
AMPL V14 6AK5-W
AMPL V15 6AK5-W
AMPL V16 6AK5-W
FINAL DRIVER V17 6360
FINAL DRIVER V18 6360
DRIVER STAGE (NORMAL)
DRIVER STAGE (NET)
.66 MC OUTPUT (NORMAL)
1.56 MC OUTPUT (NET)
9.360 KC XTAL OVEN
4.27 MC XTAL OVEN
3.891 MC XTAL OVEN

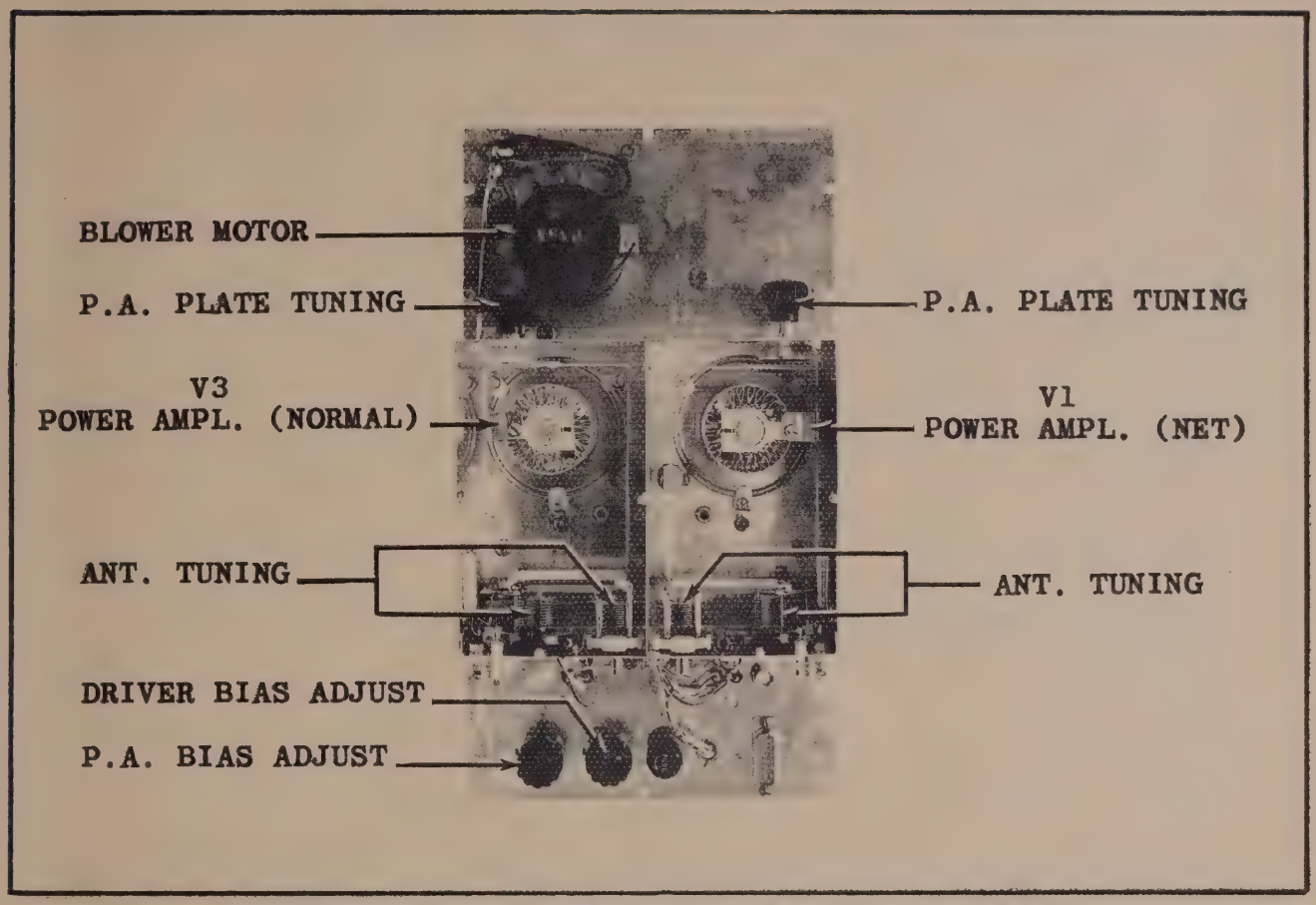


FIGURE 4.10A POWER AMPLIFIER (TOP VIEW)

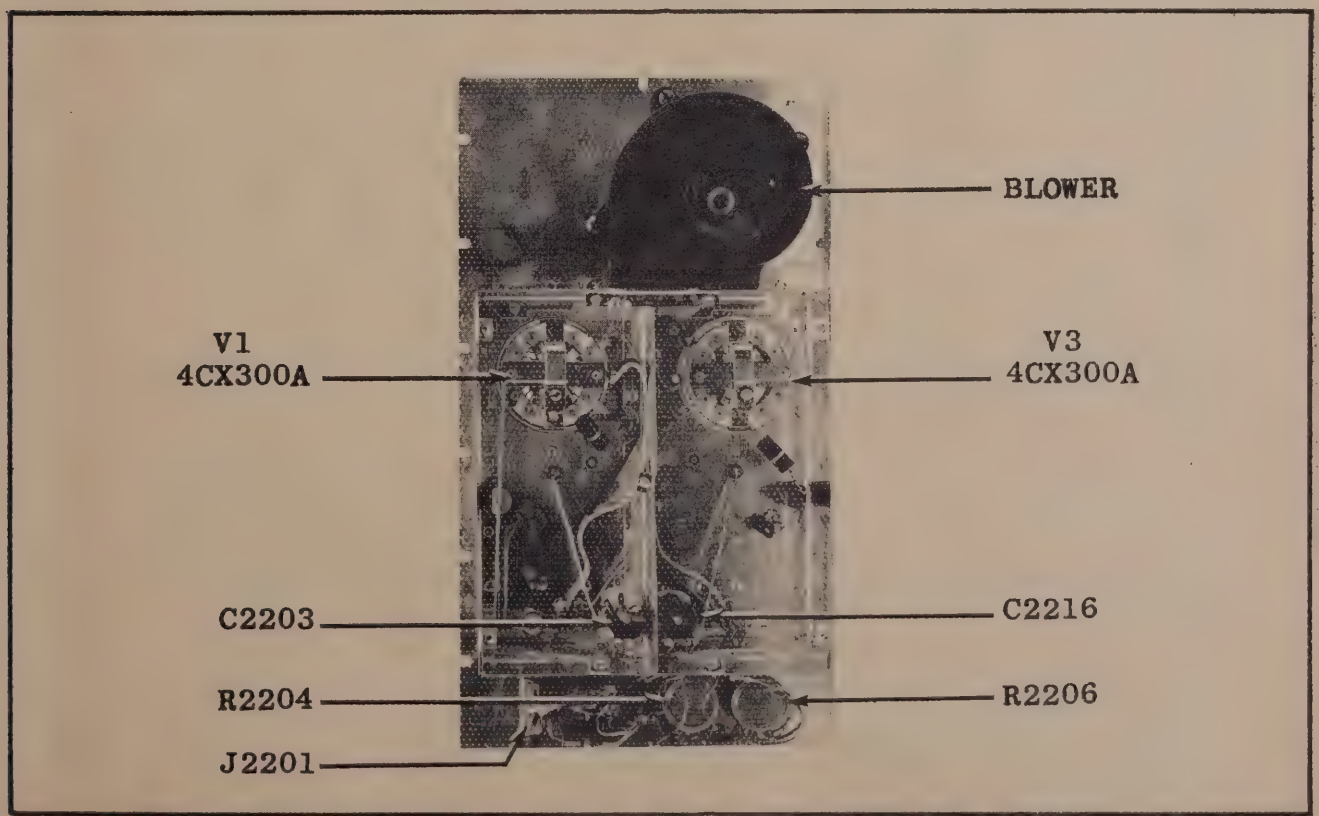


FIGURE 4.10B POWER AMPLIFIER (BOTTOM VIEW)

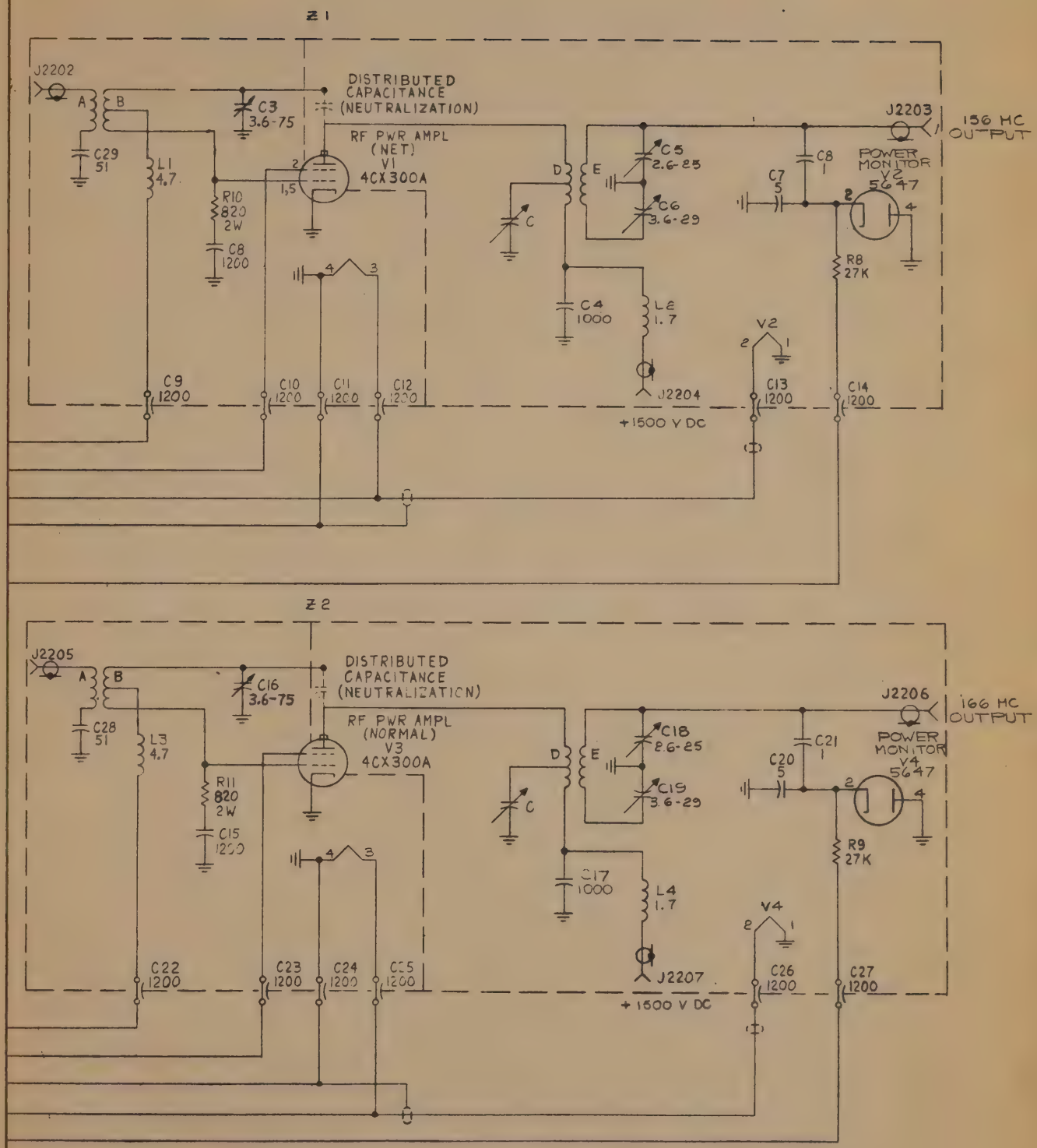
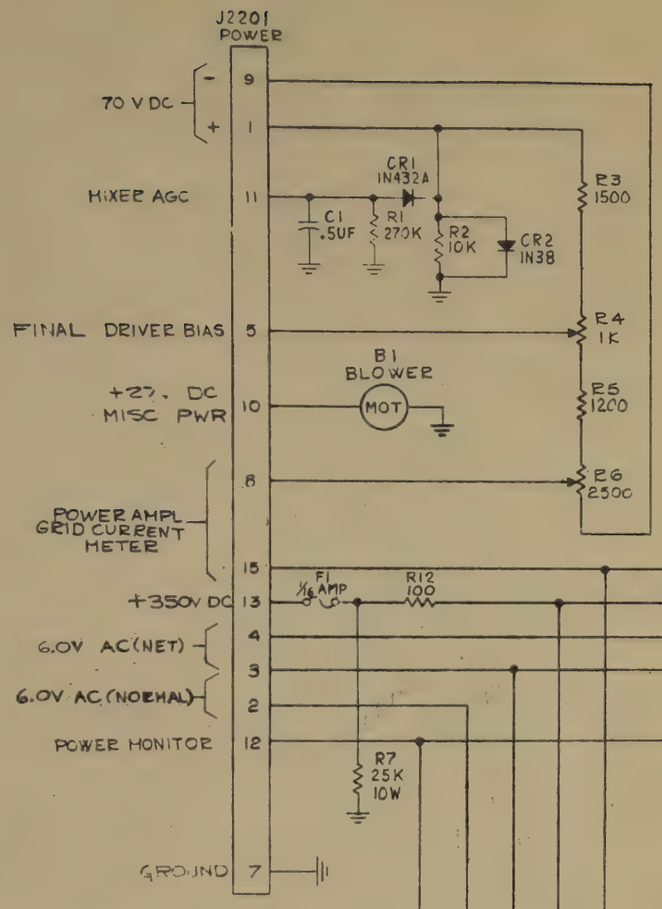


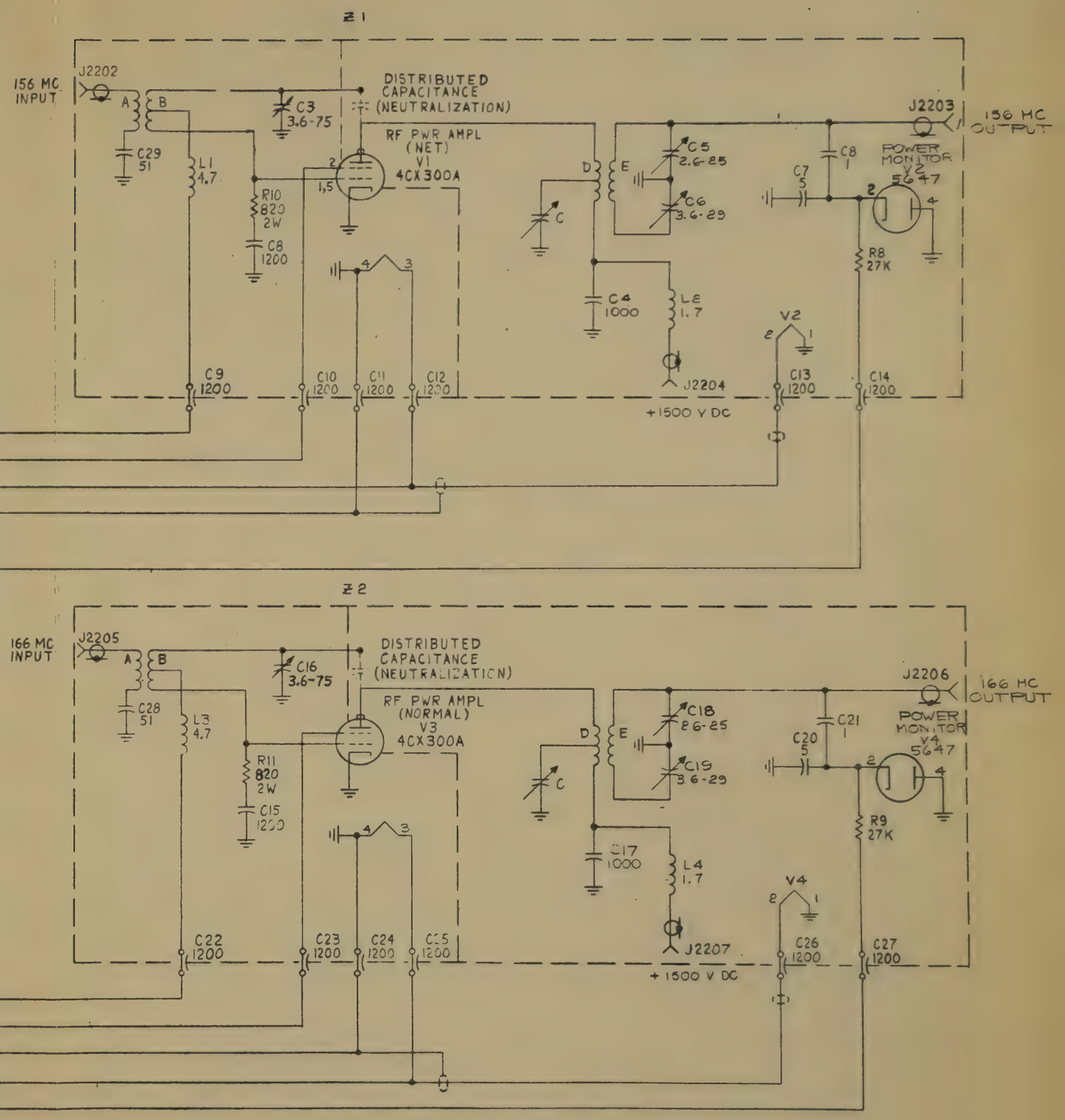
FIGURE 4.10D POWER AMPLIFIER

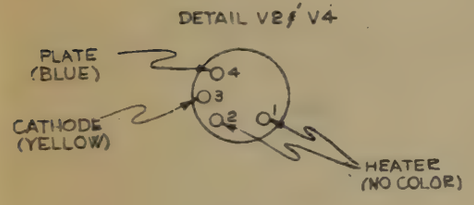
NOTES

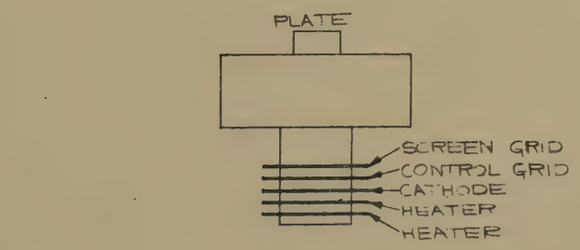
1. UNLESS OTHERWISE INDICATED; ALL RESISTORS ARE IN OHMS, ± 5 %, 1/2 WATT. ALL CAPACITORS ARE IN UUF. ALL INDUCTORS ARE IN UH.

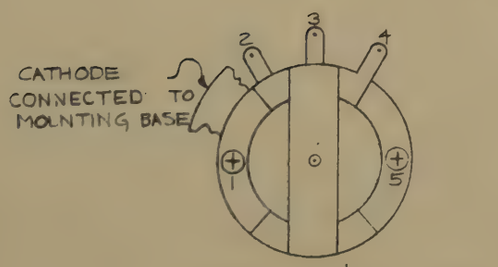
WITH THE EXCEPTION OF JACKS, AND P2001, REFERENCE DESIGNATIONS ARE ABBREVIATED. ADD 2200 TO REFERENCE NUMBERS, THAT IS READ R1 AS R2201.











DETAIL V1 & V3 TUBE & SOCKET

FIGURE 4.10D POWER AMPLIFIER.

38. Power Supply Cabinet. (Figures 4.11A, 4.11B and 4.11C).

a. Figures 4.11A and 4.11B call-out the location of the sub-chassis, tubes and major components.

b. Figure 4.11C is the schematic diagram. This diagram displays the circuitry between sub-chassis and major components.

c. Common circuitry is supplied through J3003.

39. Receiver Power Supply. (Figures 4.12A, 4.12B and 4.12C).

a. Figures 4.12A and 4.12B call-out major components by reference designation.

b. Figure 4.12C is the schematic diagram.

c. Common circuitry is provided at J3101.

40. Transmitter Power Supply. (Figures 4.13A, 4.13B and 4.13C).

a. Figures 4.13A and 4.13B call-out major components by reference designation.

b. Figure 4.13C is the schematic diagram.

c. Common circuitry is provided at J3201.

41. Dynamotor. (Figures 4.14A and 4.14B).

a. Figure 4.14A is the photo and figure 4.14B is the schematic diagram of the dynamotor.

42. Control Unit. (Figures 4.15A, 4.15B and 4.15C).

a. Figure 4.15A calls-out the operating controls and lamps by function.

b. Figure 4.15C calls-out the operating controls by reference designations.

c. Figure 4.15C is the schematic diagram. Common circuitry is provided at J4001.

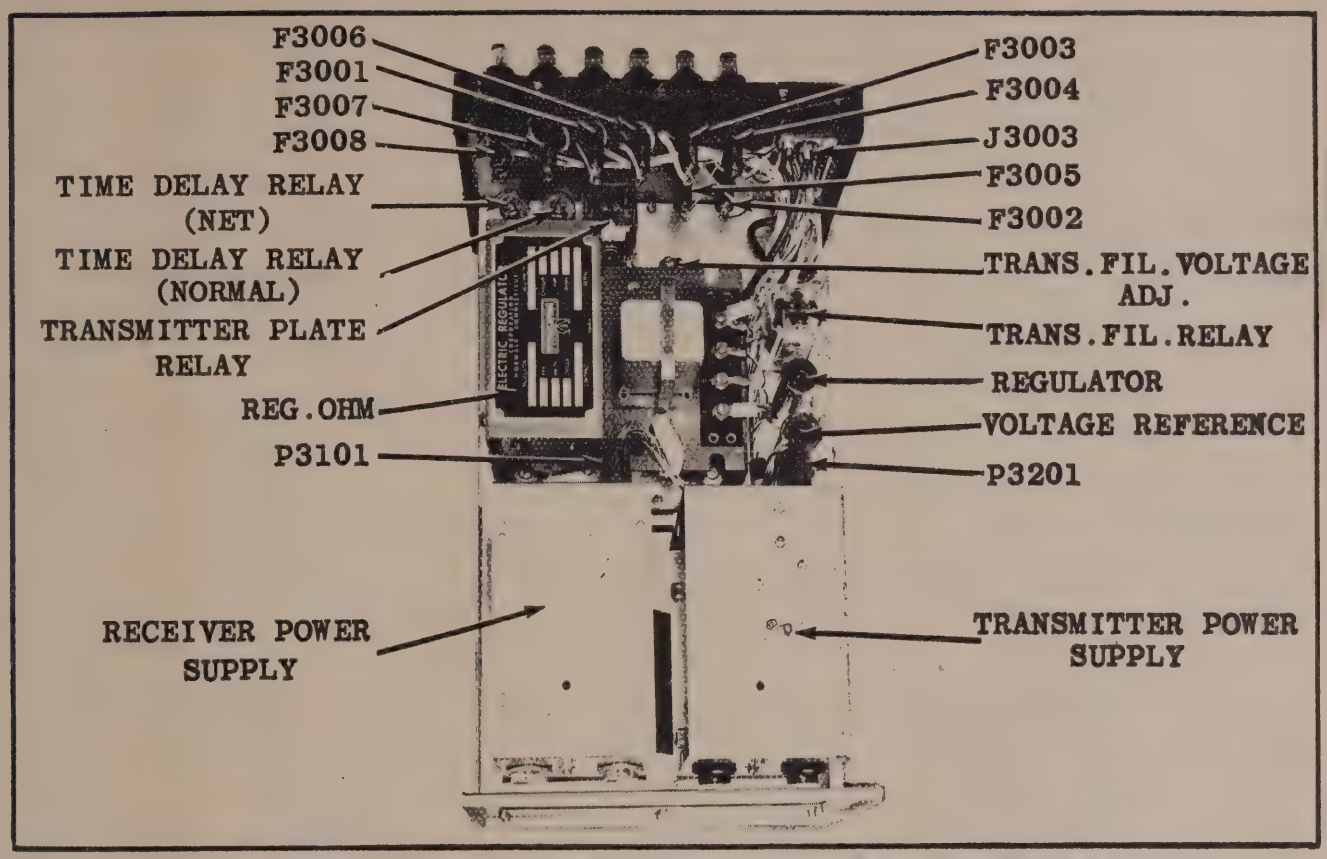


FIGURE 4.11A POWER SUPPLY CABINET (TOP VIEW)

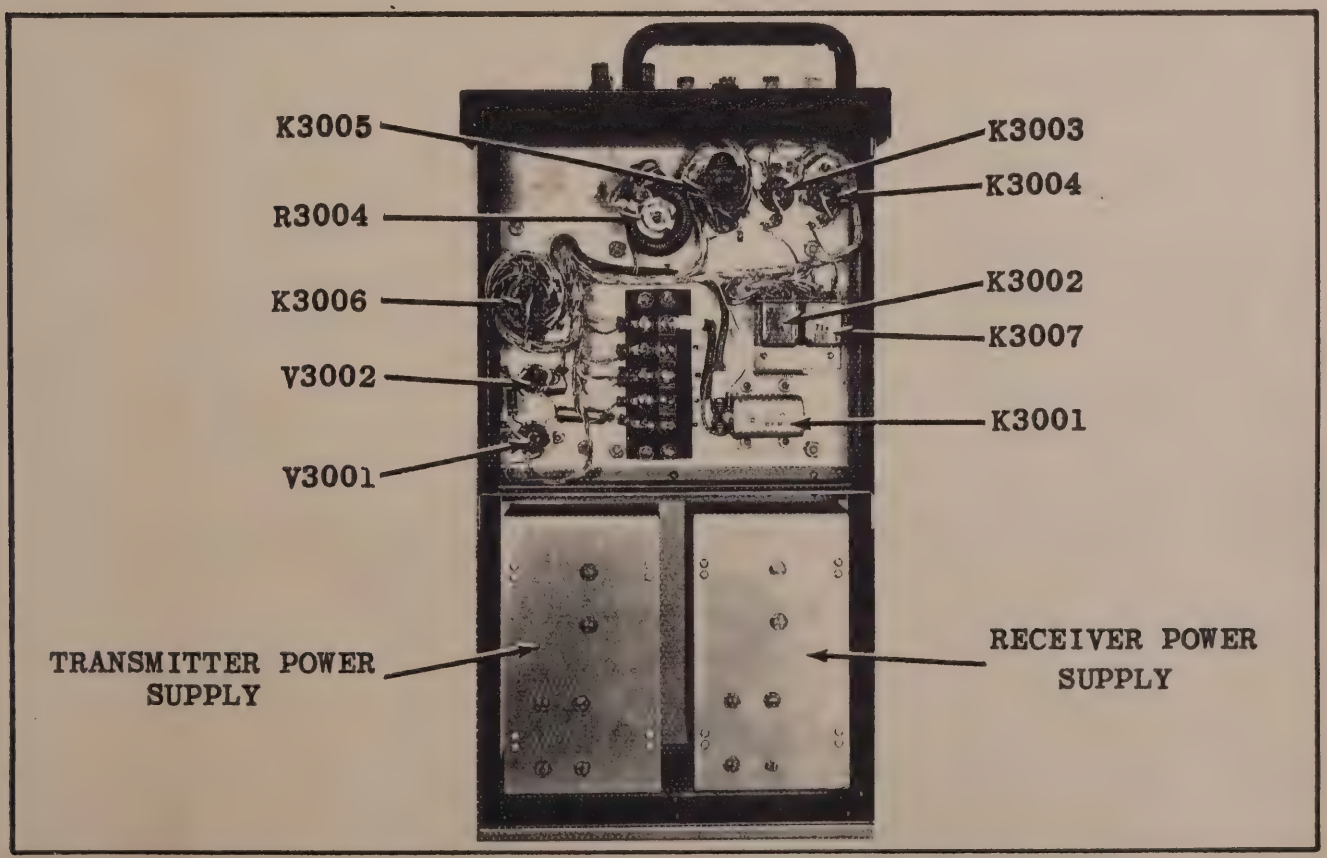


FIGURE 4.11B POWER SUPPLY CABINET (BOTTOM VIEW)

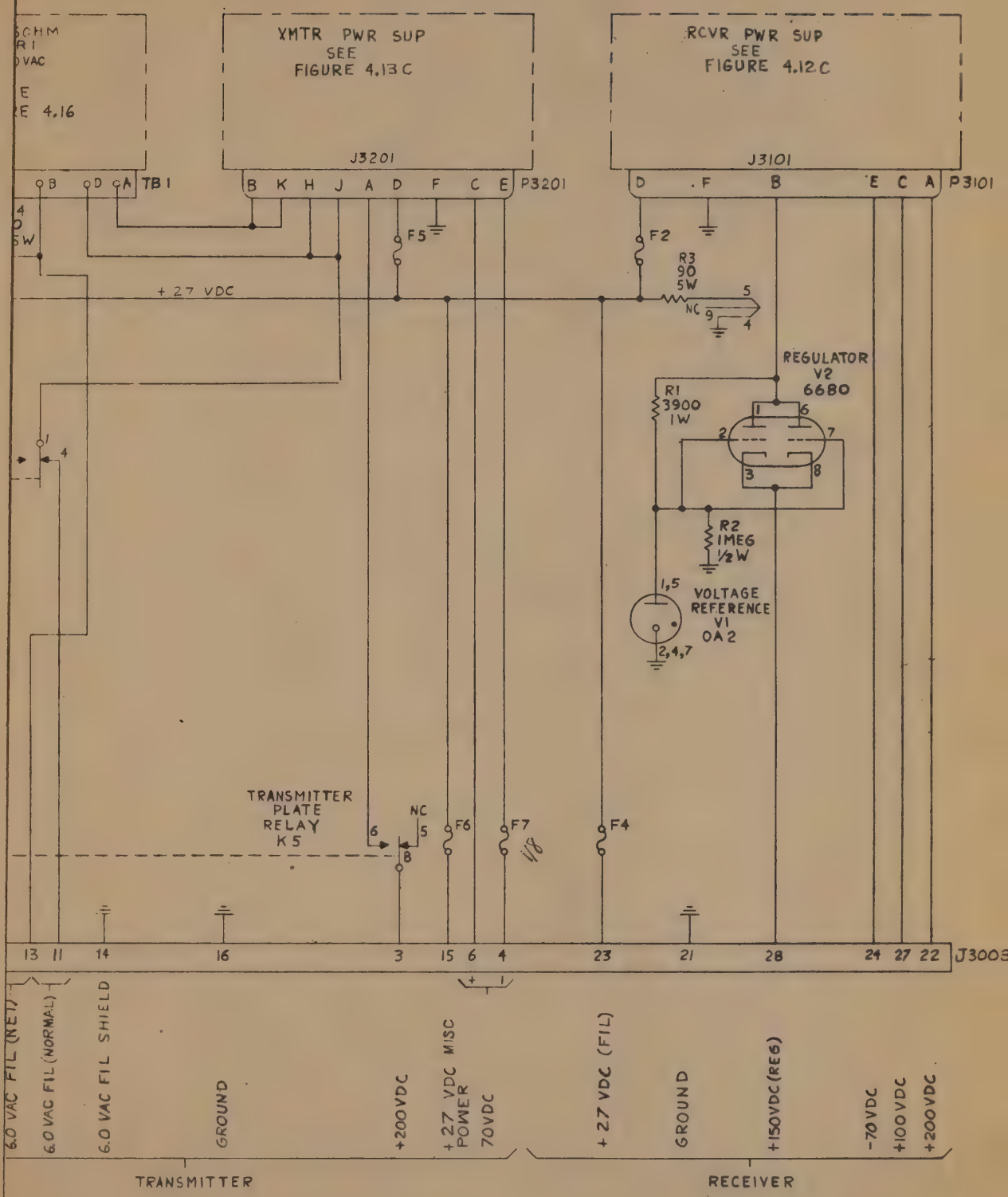


FIGURE 4.11C POWER SUPPLY CABINET

NOTES

1. UNLESS OTHERWISE INDICATED; ALL RESISTORS ARE IN OHMS, ±10%.

2. WITH THE EXCEPTION OF JACKS AND PLUGS, REFERENCE DESIGNATIONS ARE ABBREVIATED. ADD 3000 TO REFERENCE NUMBERS, THAT IS; READ R1 AS R3001.

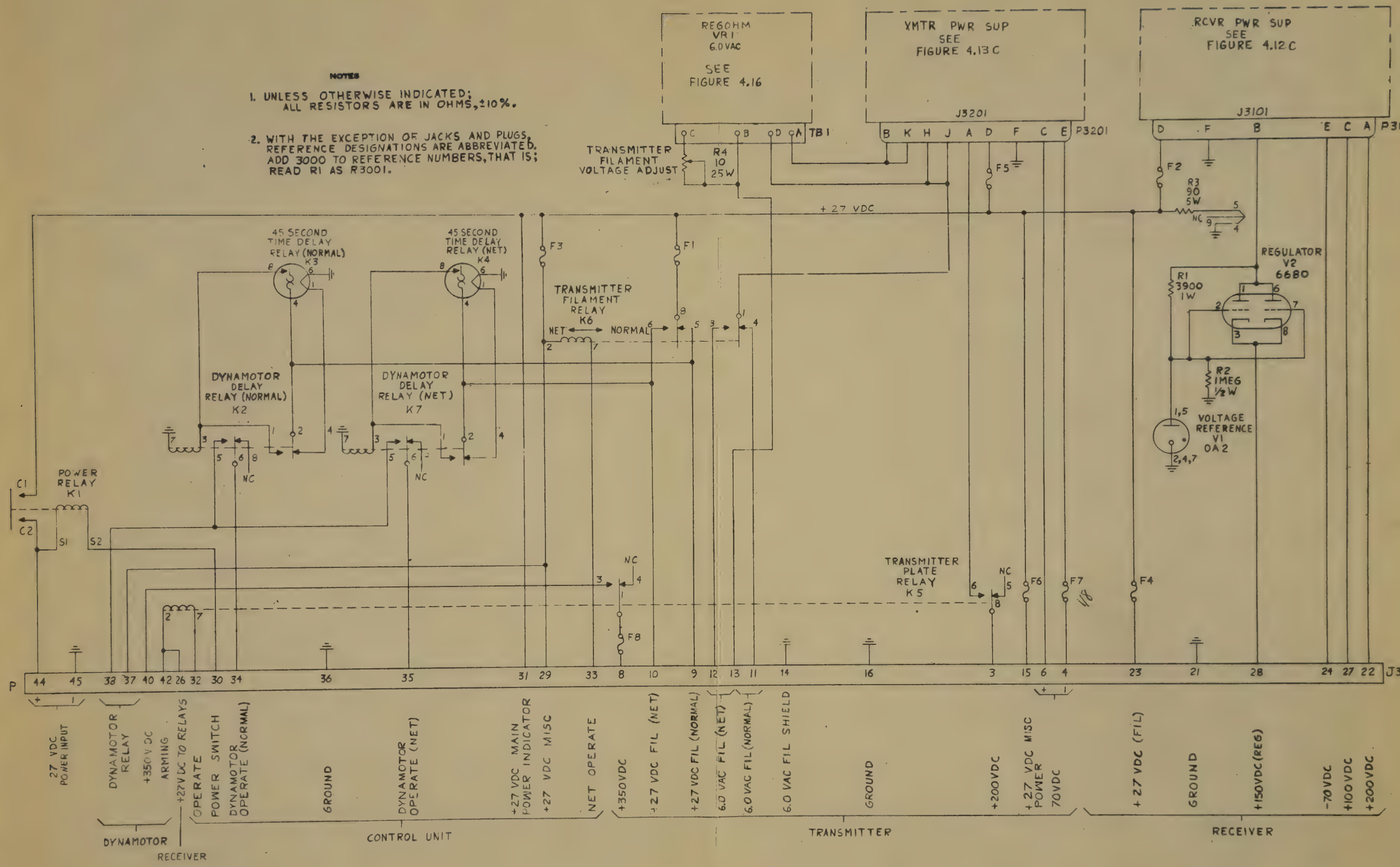


FIGURE 4.11C POWER SUPPLY CABINET

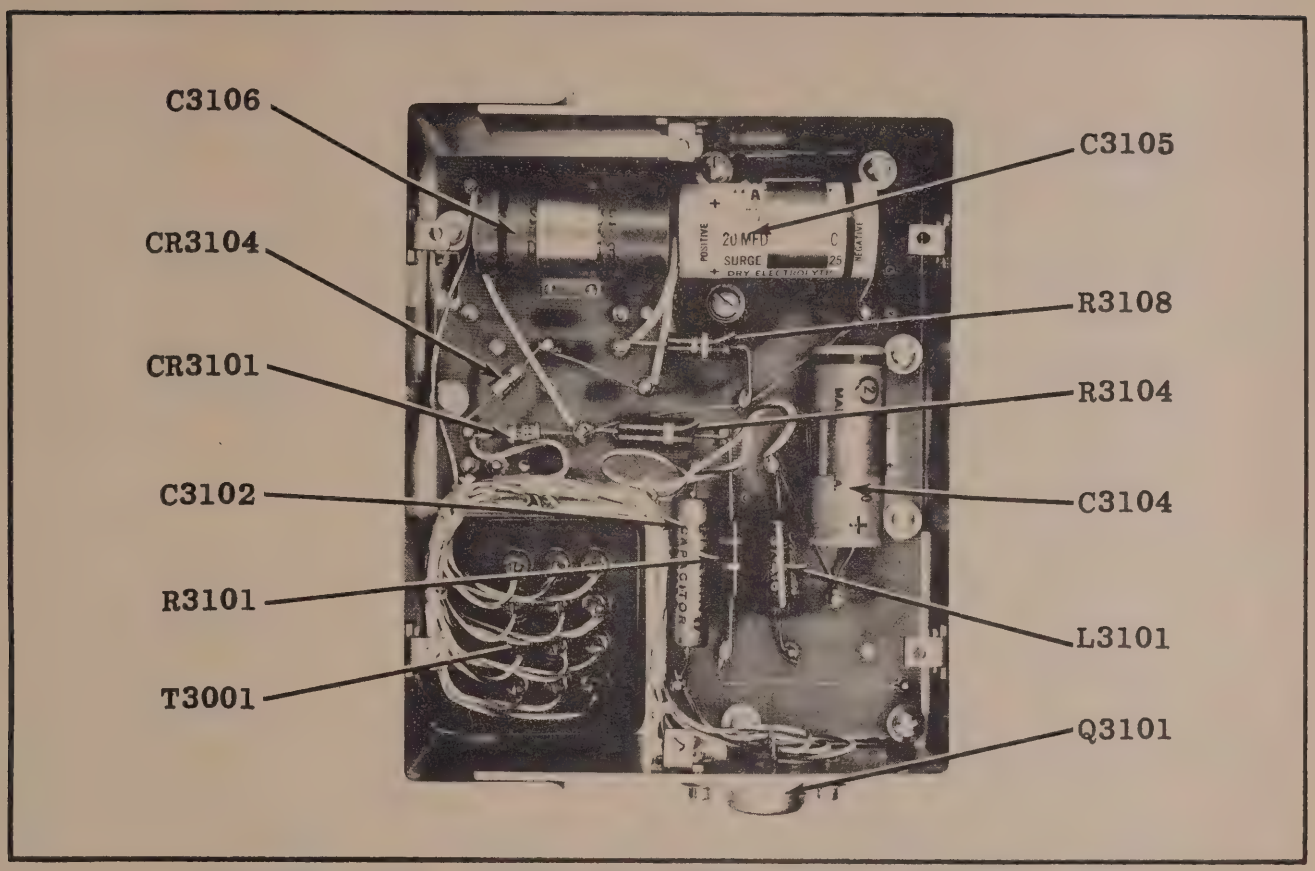


FIGURE 4.12A RECEIVER POWER SUPPLY (RIGHT VIEW)

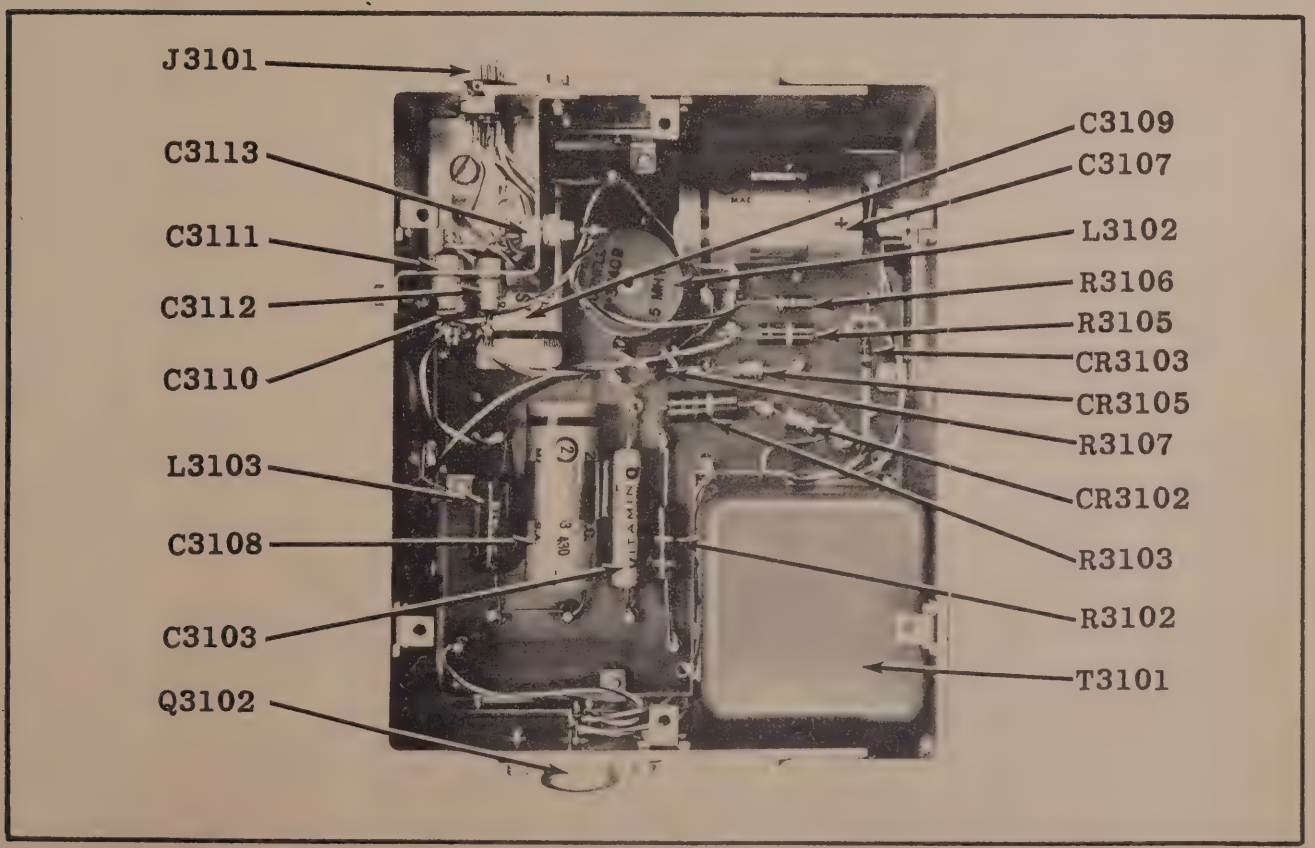


FIGURE 4.12B RECEIVER POWER SUPPLY (LEFT VIEW)

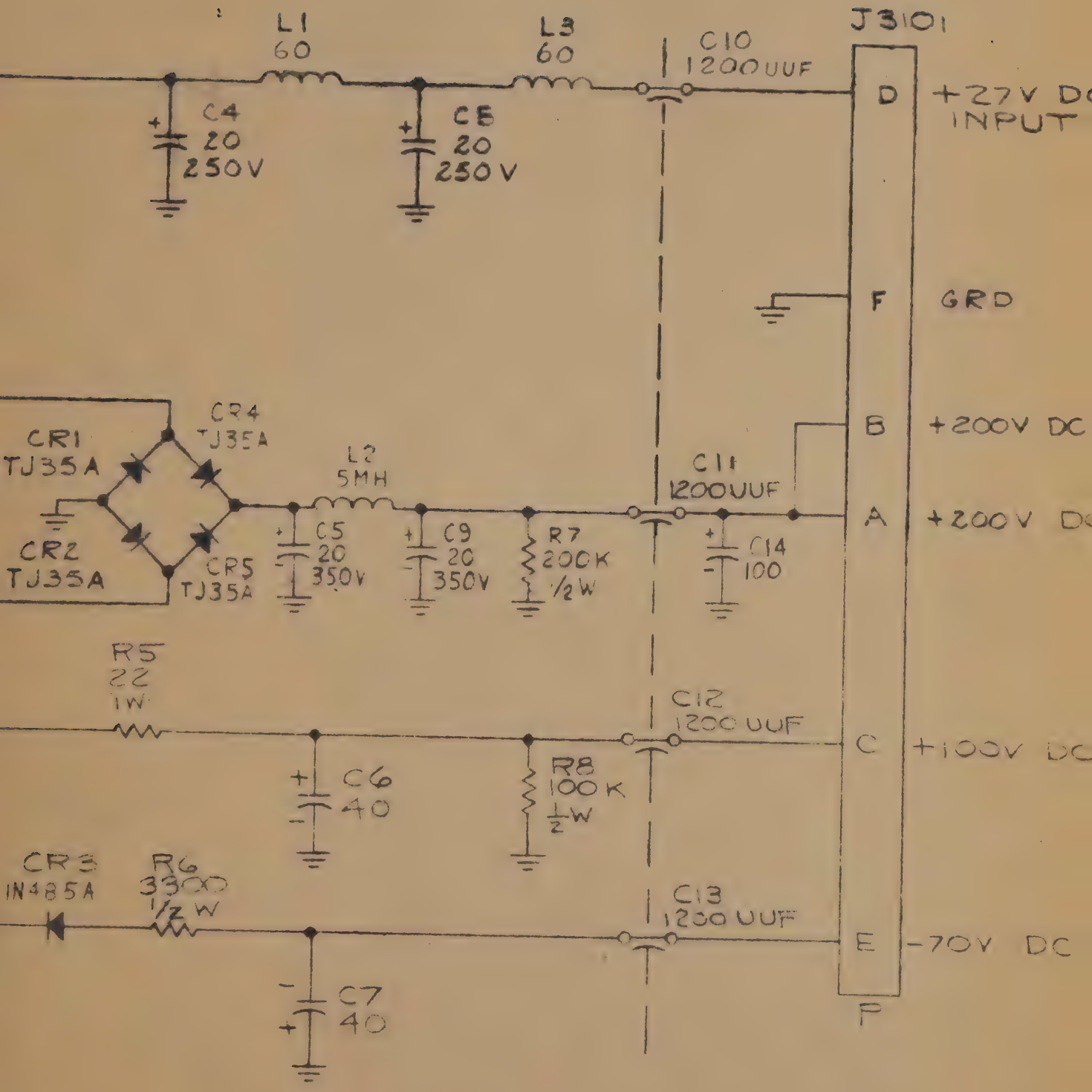


FIGURE 4.12C RECEIVER POWER SUPPLY

NOTES

1. UNLESS OTHERWISE INDICATED
   ALL RESISTORS ARE IN OHMS
   ALL CAPACITORS ARE IN UF
   ALL INDUCTORS ARE IN UH

2. ALL PARTS ARE DEFINED BY ADDING 3100 TO REFERENCE DESIGNATION. THAT IS READ R1 AS R3101-ETC

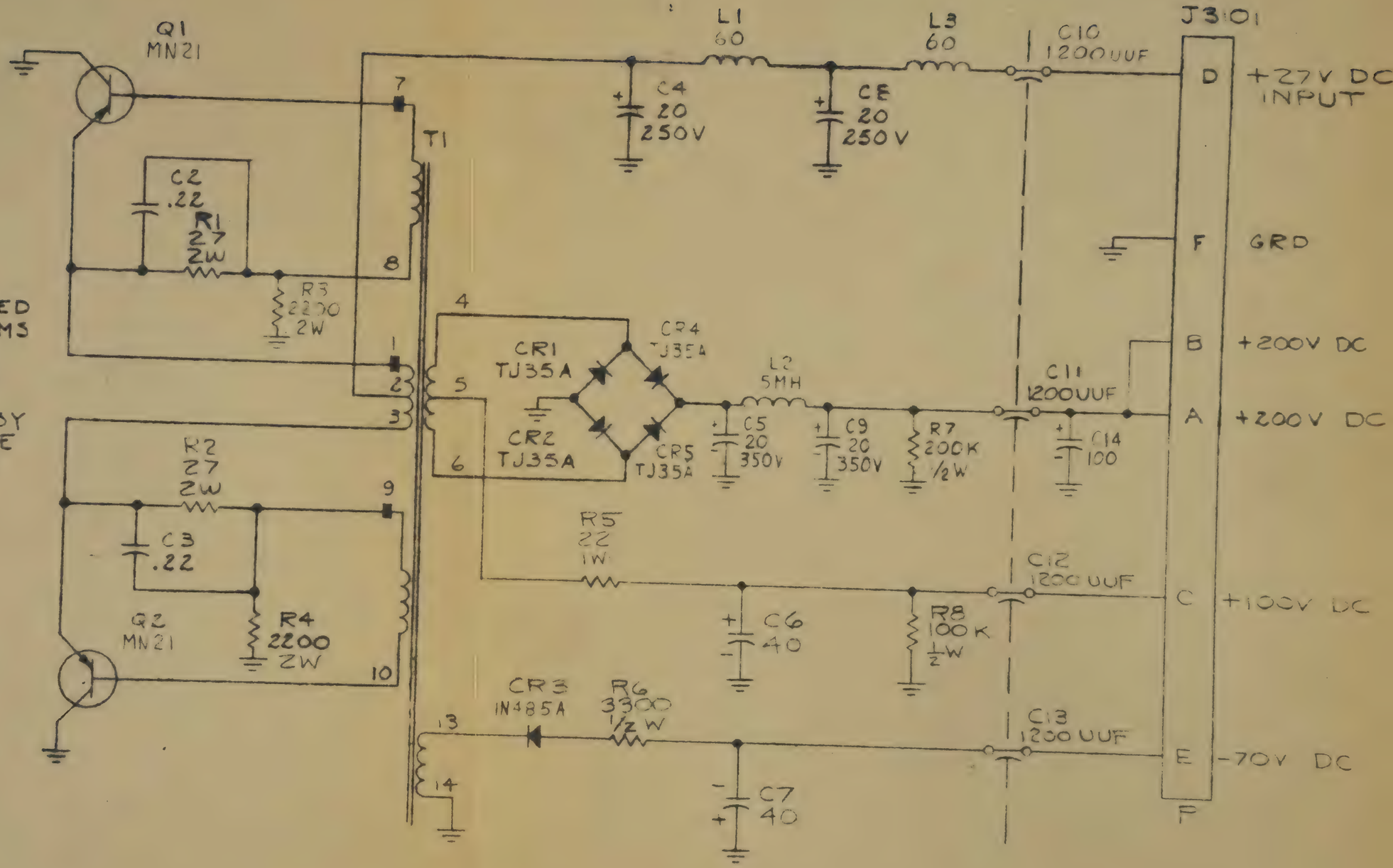


FIGURE 4.12C RECEIVER POWER SUPPLY

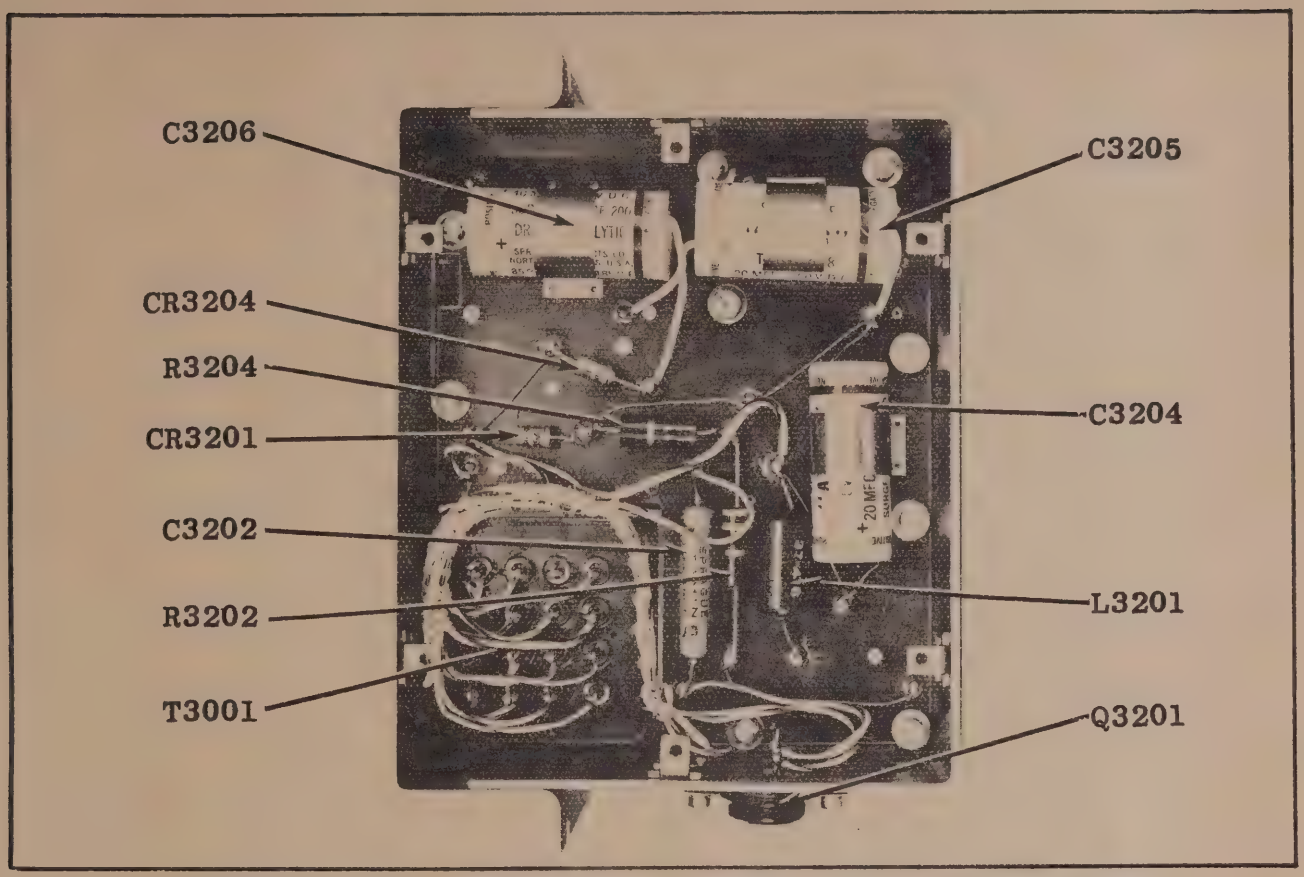


FIGURE 4.13A TRANSMITTER POWER SUPPLY (RIGHT VIEW)

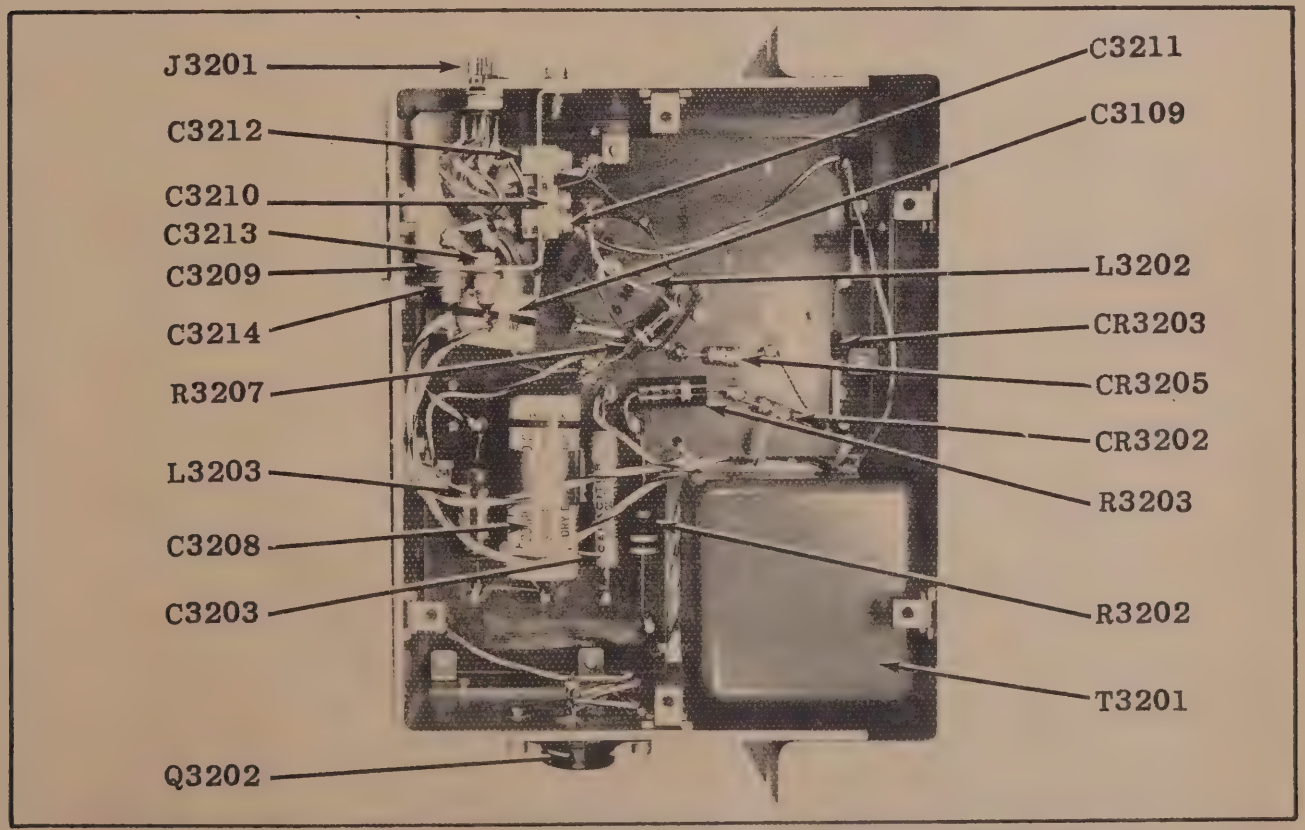


FIGURE 4.13B TRANSMITTER POWER SUPPLY (LEFT VIEW)

NOTES

1. UNLESS OTHERWISE INDICATED
   ALL RESISTORS ARE IN OHMS
   ALL CAPACITORS ARE IN UF
   ALL INDUCTORS ARE IN UH

2. ALL PARTS ARE DEFINED BY ADDING 3200 TO REFERENCE DESIGNATION. THAT IS READ R1 AS R3201 - ETC

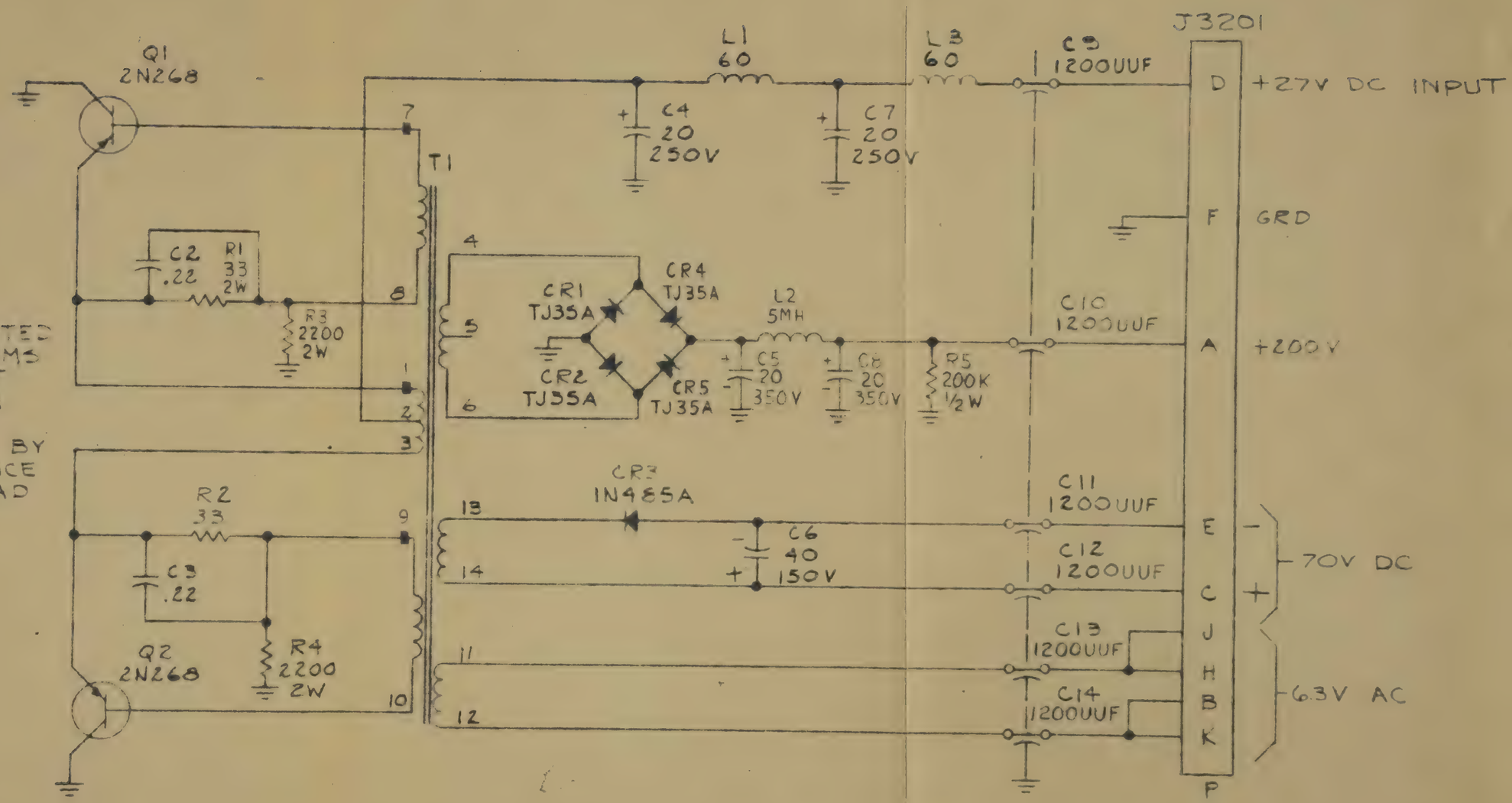


FIGURE 4.13C TRANSMITTER POWER SUPPLY

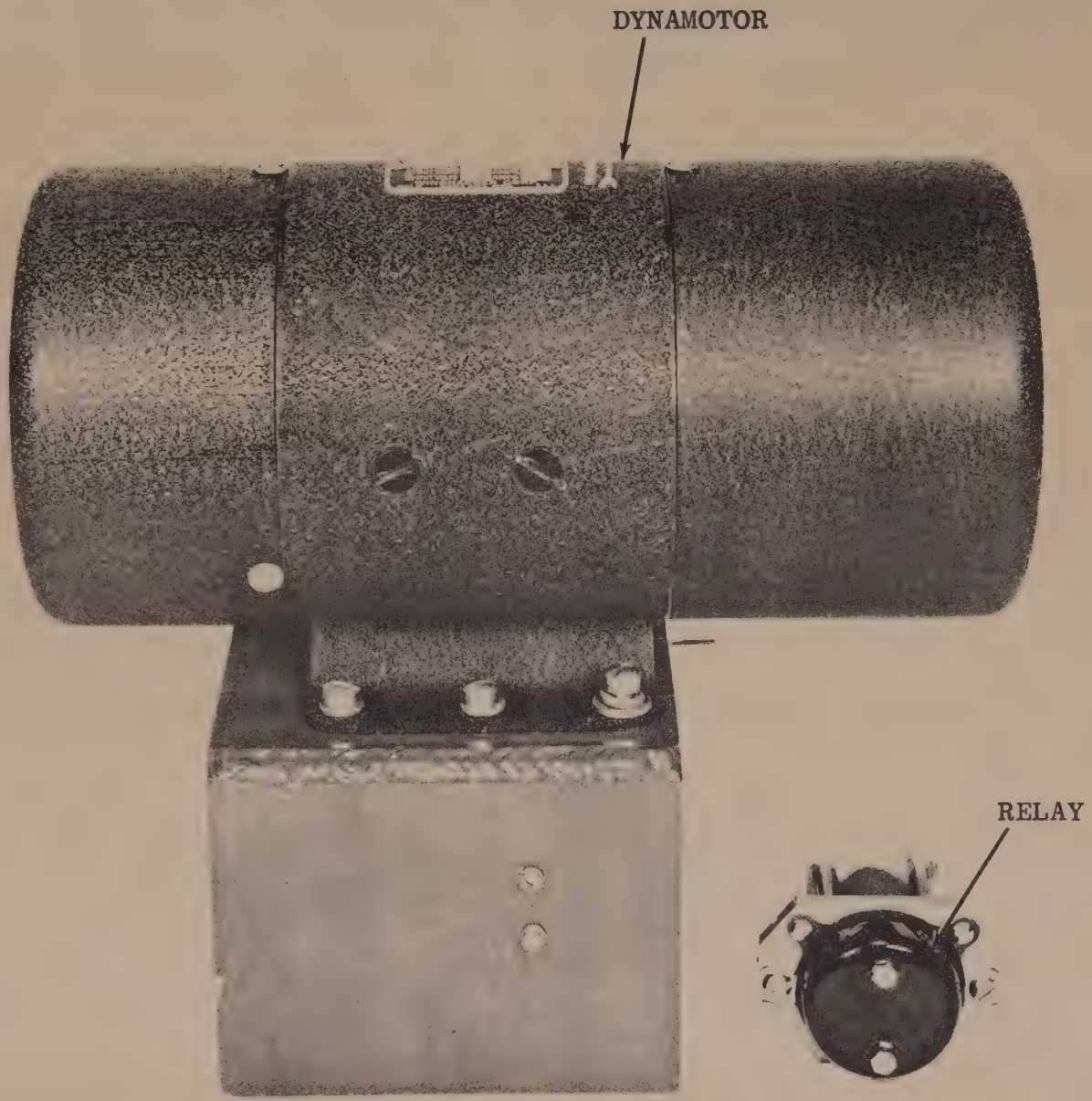


FIGURE 4.14A. DYNAMOTOR

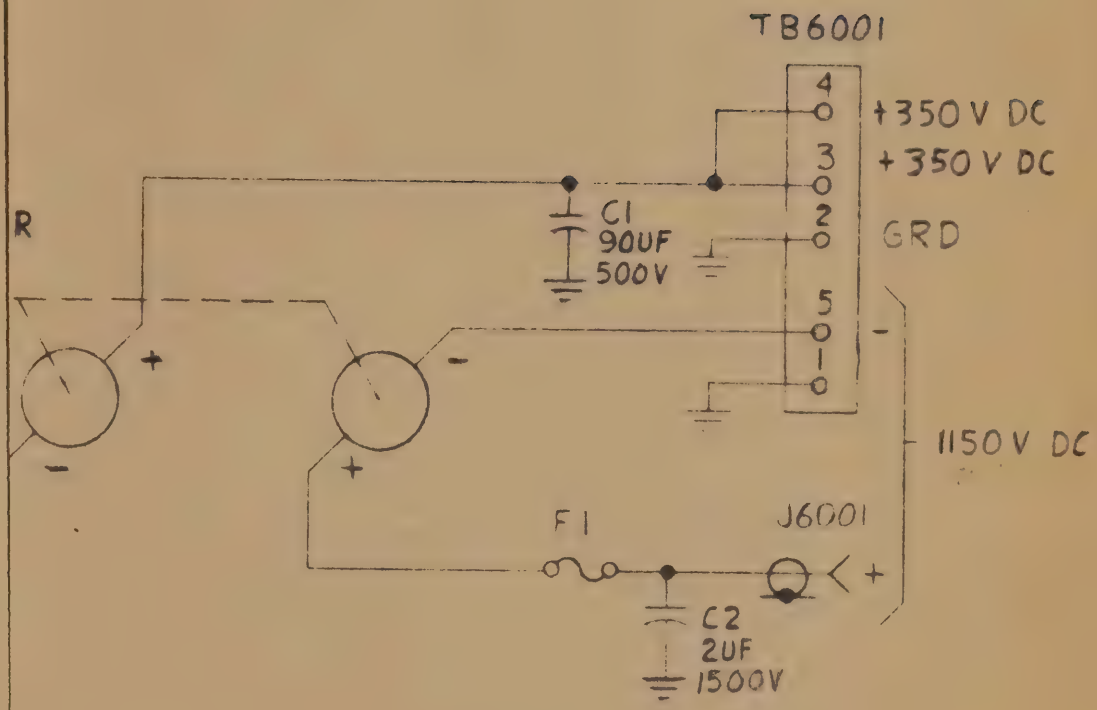


FIGURE 4.14B DYNAMOTOR

NOTES

1. WITH THE EXCEPTION OF JACKS, REFERENCE DESIGNATIONS ARE ABBREVIATED. ADD 6000 TO REFERENCE NUMBERS, THAT IS; READ F1 AS F6001.

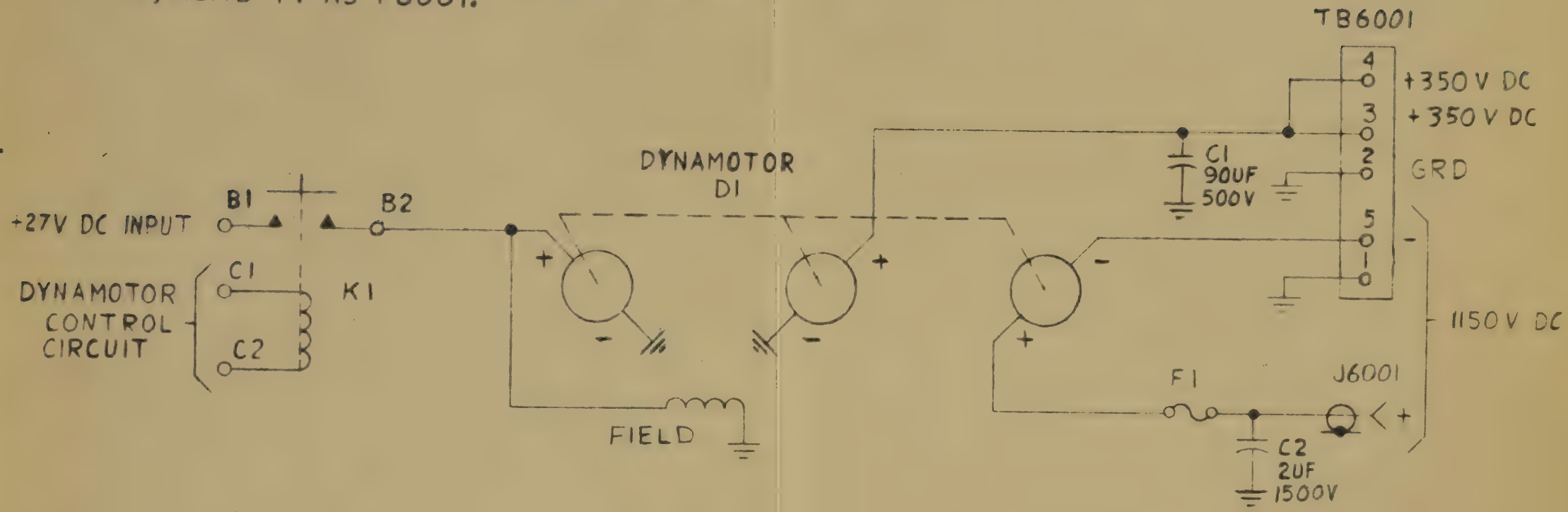


FIGURE 4.14B DYNAMOTOR

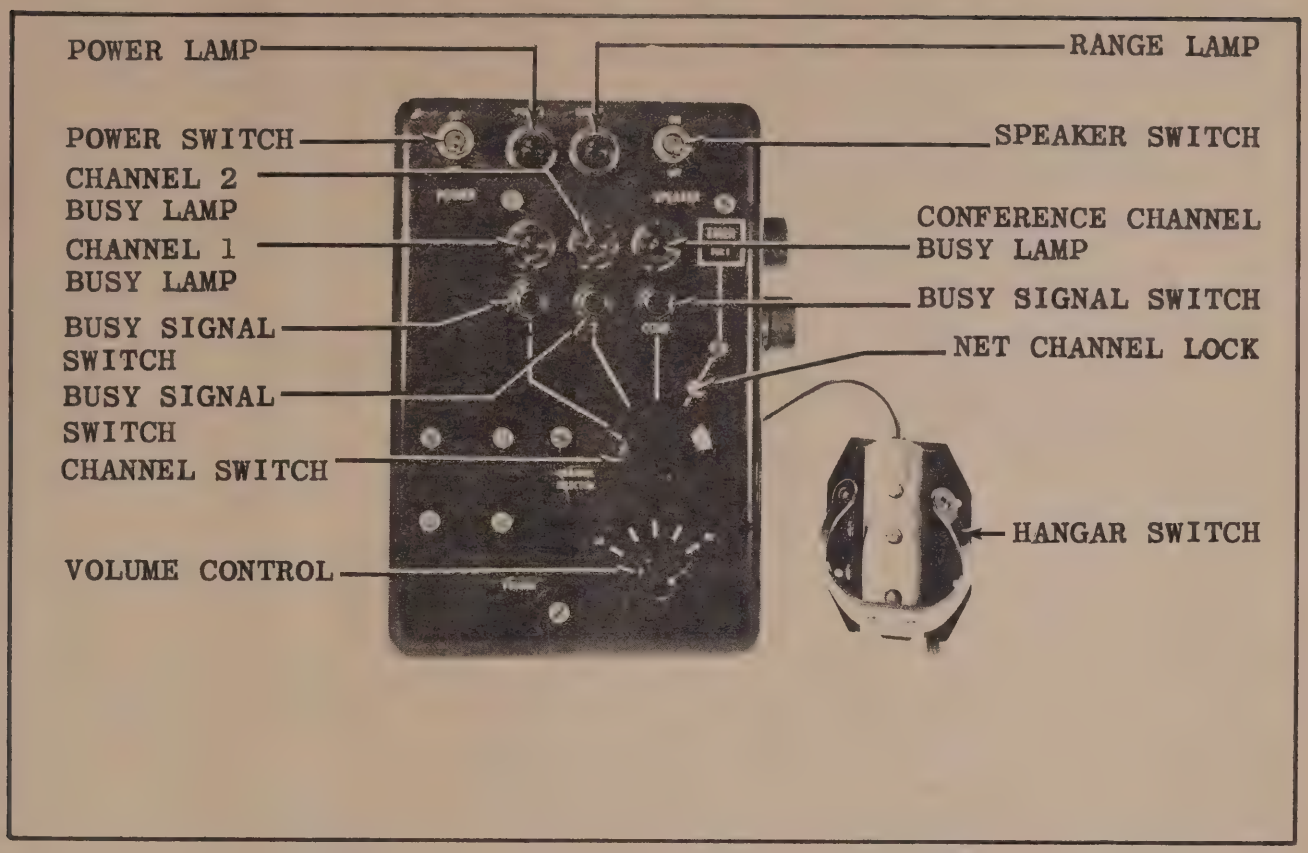


FIGURE 4.15A CONTROL UNIT (TOP VIEW)

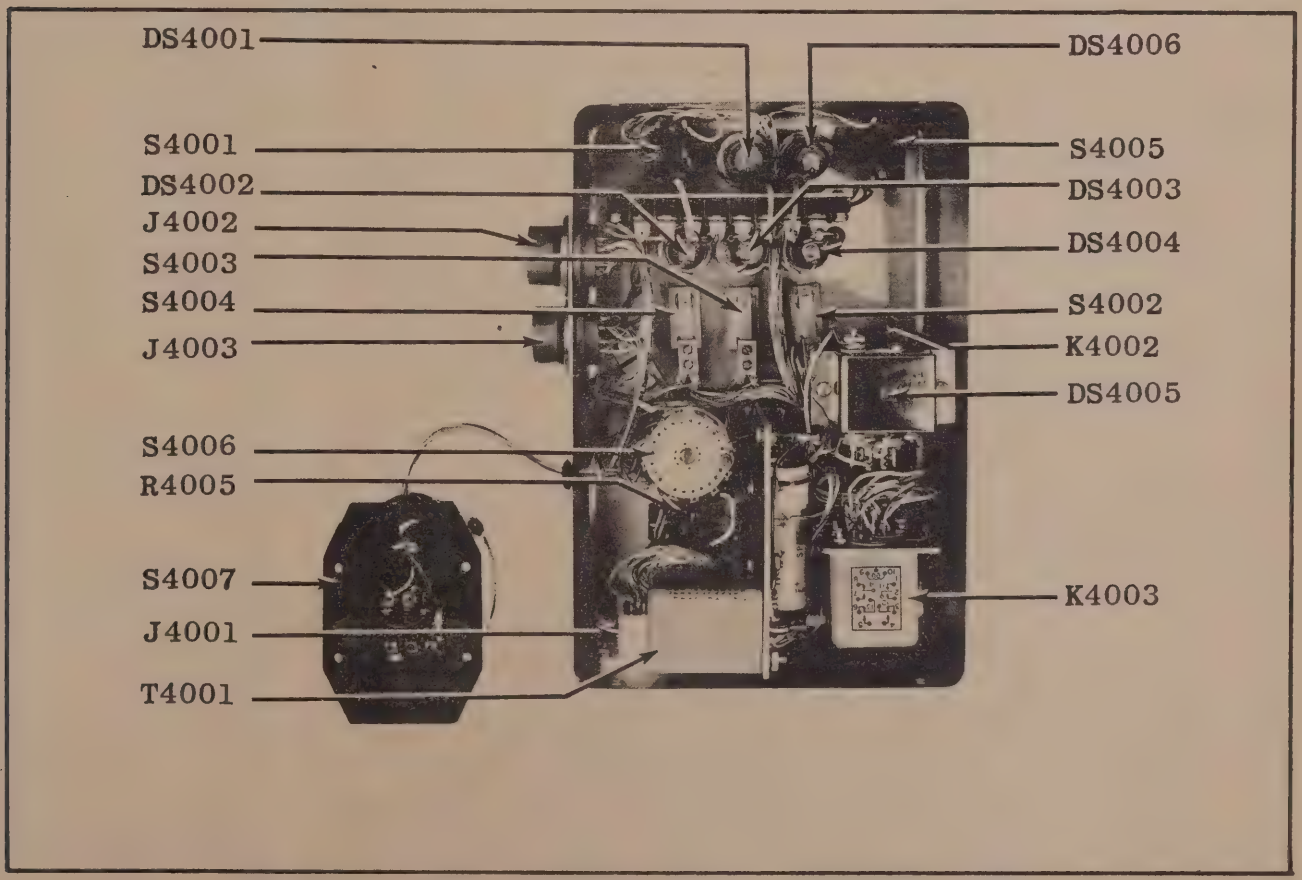
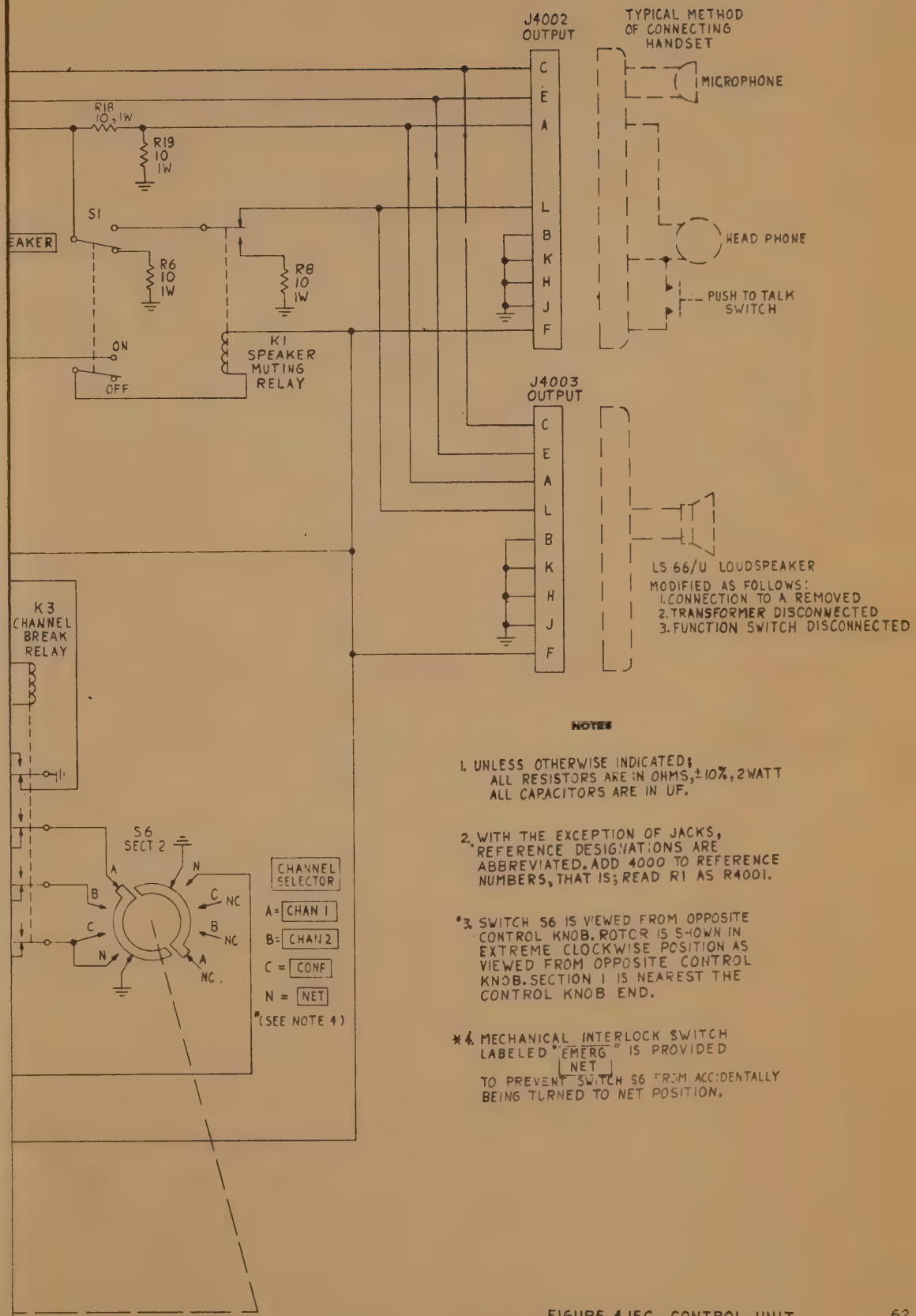


FIGURE 4.15B CONTROL UNIT (BOTTOM VIEW)



NOTES

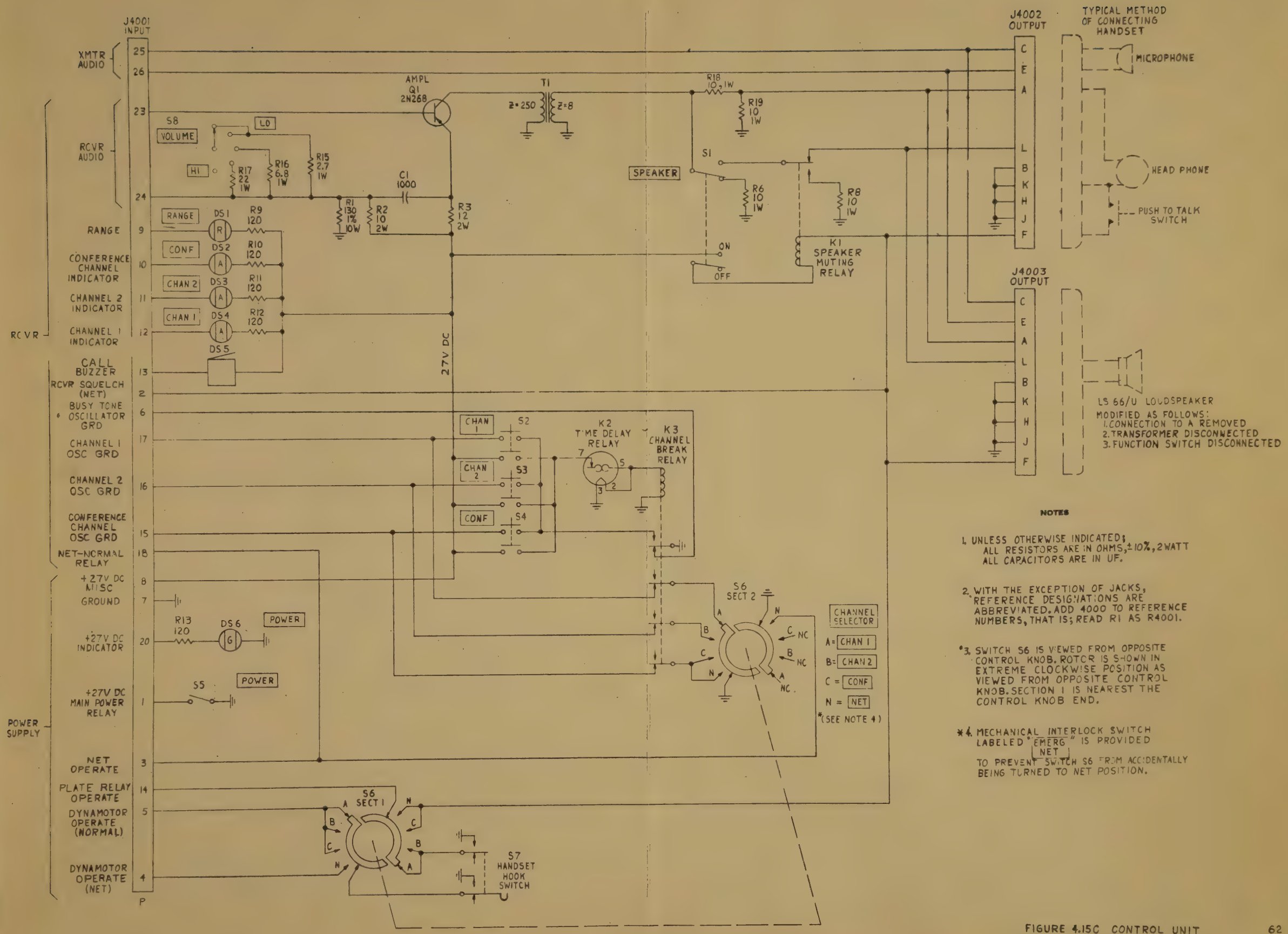
1. UNLESS OTHERWISE INDICATED; ALL RESISTORS ARE IN OHMS, ±10%, 2 WATT ALL CAPACITORS ARE IN UF.

2. WITH THE EXCEPTION OF JACKS, REFERENCE DESIGNATIONS ARE ABBREVIATED. ADD 4000 TO REFERENCE NUMBERS, THAT IS; READ R1 AS R4001.

*3. SWITCH S6 IS VIEWED FROM OPPOSITE CONTROL KNOB. ROTOR IS SHOWN IN EXTREME CLOCKWISE POSITION AS VIEWED FROM OPPOSITE CONTROL KNOB. SECTION 1 IS NEAREST THE CONTROL KNOB END.

*4. MECHANICAL INTERLOCK SWITCH LABELED "EMERG (NET)" IS PROVIDED TO PREVENT SWITCH S6 FROM ACCIDENTALLY BEING TURNED TO NET POSITION.

FIGURE 4.15C CONTROL UNIT



NOTES

1. UNLESS OTHERWISE INDICATED; ALL RESISTORS ARE IN OHMS, ±10%, 2 WATT ALL CAPACITORS ARE IN UF.

2. WITH THE EXCEPTION OF JACKS, REFERENCE DESIGNATIONS ARE ABBREVIATED. ADD 4000 TO REFERENCE NUMBERS, THAT IS; READ R1 AS R4001.

*3. SWITCH S6 IS VIEWED FROM OPPOSITE CONTROL KNOB. ROTOR IS SHOWN IN EXTREME CLOCKWISE POSITION AS VIEWED FROM OPPOSITE CONTROL KNOB. SECTION 1 IS NEAREST THE CONTROL KNOB END.

**4. MECHANICAL INTERLOCK SWITCH LABELED "EMERG NET" IS PROVIDED TO PREVENT SWITCH S6 FROM ACCIDENTALLY BEING TURNED TO NET POSITION.

FIGURE 4.15C CONTROL UNIT

SECTION II. ALIGNMENT PROCEDURE

43. Receiver.

a. VHF and Audio Unit

Step 1. Oscillator alignment and frequency adjustment.

A. Connect input of Hewlett Packard frequency counter to the suppressor grid (pin 7) of the SSB detector V10. Adjust C79 until the frequency indicated by the frequency counter is 452 kc ± 1 cycle.

B. Connect the DC probe of a Hewlett Packard VTVM to the grid (pin 1) of the first local oscillator tube V5. Adjust the inductance L9 for maximum negative voltage on this grid. Remove the VTVM DC probe from the grid and connect the AC probe of the VTVM to the grid (pin 1) of amplifier (V6). Adjust Z4 for maximum RF. Adjust L9 for maximum RF output. Move the AC probe of the VTVM to the grid (pin 1) of the first mixer (V3) and adjust Z5 for maximum output. Repeak L9 and Z4 for maximum output. Connect the VHF input of the counter to the grid (pin 1) of the first mixer (V3). Adjust capacitor C42 until the counter indicates the desired frequency. This will vary depending on the system frequency required.

Step 2. VHF Amplifier #2 and #3 Alignment.

A. Connect the VTVM AC probe to the #2 VHF amplifier output connector at the front panel J1403 adjust Z6 for maximum RF output.

B. Connect the VTVM AC probe to the #3 amplifier output connector at the front panel J1404. Adjust Z7 for maximum RF output.

Step 3. IF_1 Amplifier Alignment.

A. Connect the output of a 65B Measurements Corporation Signal Generator (tuned to 6.704 mc) to the grid (pin 1) of the first mixer V3. Connect the RF probe of the VTVM to the connector J1402. Adjust L8, L7, L6 and L5 for maximum output.

B. Connect the output of a Hewlett Packard 608C Signal Generator to the grid (pin 1) of the second VHF amplifier leaving the AC probe of the VTVM connected to the coax connector J1402. Adjust Z_3 for maximum output after tuning the signal generator and adjusting its level for approximately 1 volt of RF output.

C. Move the signal generator output to the grid (pin 1) of the first RF amplifier VI. Adjust Z_1 and Z_2 for maximum signal

b. Frequency Correction Unit

Step 1. Signal Circuit Alignment

A. Set Measurements Corp. 65B Signal Generator to 480 kc. Connect the output of the signal generator to the grid (pin 1) of the second IF_2 amplifier (V6) through a small coupling capacitor. Connect the DC probe of the VTVM to the receiver AGC bus at the junction of R37 and C43. Adjust L_2 and L_3 for maximum AGC voltage.

B. Set the Measurements Corp.65B Signal Generator to 465 kc and connect its output to the grid (pin 1) of the first IF_2 amplifier (V5), connect the AC probe of the VTVM to the grid (pin 1) of V6. Adjust L_1 for maximum signal output.

These 3 coils are the only signal circuit adjustments on this chassis.

Step 2. Oscillator Adjustment

A. 6.150 MC Oscillator:

1. Place AC probe of the VTVM on the grid (pin 1) of isolation amplifier (V8). Adjust L4 for maximum signal level.

2. Connect Hewlett Packard Counter to J1204. Adjust C49 until the oscillator frequency, as indicated by the counter, is 6.150 mc ± 2 cycles.

3. Reconnect the Coaxial Plug P1204 to J1204.

B. Channel Oscillators:

1. Set channel switch to channel 1.

2. Connect Hewlett Packard frequency counter to the common output point at the junction of L9 and C111.

3. Adjust C90 until the frequency indicated by the counter is the same as that on the crystal oven ± 1 cycle.

4. Set channel switch to channel 2.

5. Adjust C97 until the frequency as indicated by the counter is the same as marked on the crystal oven ± 1 cycle.

6. Set channel switch to net channel.

7. Adjust C104 until the frequency as indicated by the counter is 374 kc ± 1 cycle.

This completes the frequency alignment of the 4 oscillators found on the frequency connection chassis.

Step 3. Frequency Connection Loop.

A. Set the Measurements Corp. Signal Generator to 6.280 mc and connect its output to the grid (pin 1) of the fifth mixer (V10). Connect the AC probe of the VTVM to the suppressor grid (pin 7) of the third mixer (V4). Then adjust L8, C87, and C70 in the order listed for maximum output.

B. Move the AC probe of the VTVM to the coaxial connector J1210 and adjust L7 and C76 for maximum output, as indicated by the VTVM.

C. Set the frequency of the Measurements Corporation Signal Generator to 6.630 mc. Connect its output to the grid (pin 1) of the fourth mixer (V9). Leave the AC probe of the VTVM connected to J1210. Adjust C127 and C63 for maximum output.

D. Connect the 480 kc output of the automatic phase control to J1205. This makes the frequency loop complete. Adjust C63, C127, C70, C76 and L7 for maximum output at J1210 as indicated on the AC scale of the VTVM.

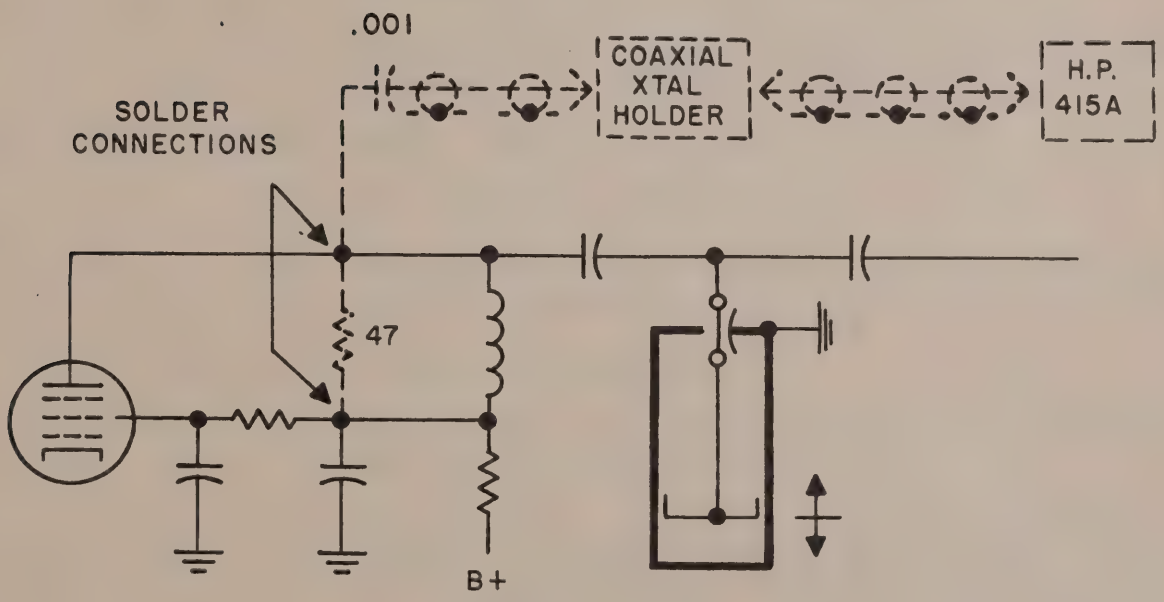
E. Place the DC probe on the VTVM on the suppressor grid (pin 7) of the third mixer (V4). Repeak L8 and C87 for maximum output.

This completes the alignment of all the circuits of the frequency connection chassis. L7 will need to be re-adjusted where even the receiver is connected to the transmitter.

The Signal circuits L2 and L3 will need to be re-adjusted for maximum AGC when the higher frequency circuits are aligned and a VHF signal fed into the antenna terminals.

Step 4. VHF Filter Alignment.

A. Connect the plate circuit of the first RF amplifier as follows: (Displayed in dotted lines).



B. Connect the output of the Coaxial Crystal Holder to an HP 415A Vacuum Tube Volt Meter.

C. Turn on power to receiver.

D. Connect an HP 608A Signal Generator through a 6 or 10 db pad to the input filter.

E. Adjust Signal Generator frequency to 166.25 MC.

F. Modulate the 166.25 MC Signal with a 1KC signal adjusted to fifty percent modulation.

G. Adjust Signal Generator output to the full 60 DB scale.

H. Adjust C1 for a minimum reading on the VTVM. Increase the Signal Generator output as necessary.

I. Change Signal Generator frequency to 156.3MC.

J. Increase the Signal Generator output until a reading is obtained on the VTVM.

K. Adjust C2 for maximum reading. Reduce Signal Generator output as required.

L. Adjust C3 for maximum reading. Decrease Signal Generator output as required.

M. Repeat steps 6 through 12.

N. Turn Receiver Power off.

O. Remove the 47 ohm resistor and .001 condenser from the circuit.

Step 5. Automatic Phase Control.

A. Short input to limiter V1 and connect HP524A counter to output jack J1108.

B. Adjust C15 to obtain frequency of 480KC on counter. If 480KC cannot be obtained, add a 5 to 10 uuf condenser across the primary of the oscillator coil. (Red and Blue leads). Disconnect counter after adjustment is completed.

C. Short out oscillator by gounding the cathode (pin 2 of V4) and connect a 65B Signal Generator to the input jack J1101. Set frequency to 480.0 KC and level to 1.0 volt.

D. Connect a HP 410B Vacuum Tube Voltmeter to the secondary coil of T1. Tune slug for maximum reading.

E. Read signal voltage at grids of Phase Inverter V2 (pins 2 and 7). Voltages should be equal and approximately three volts.

F. Remove short from Oscillator cathode and short input to Limiter (V1). Measure DC voltage output of Phase Detector at test point J1107 using a HP 410B Vacuum Tube Voltmeter. This reading should be 0 ± .2 V. DC. Higher voltage readings indicate unbalance between CR1 and CR2.

G. Connect 65B Signal Generator to input jack J1101. Set input signal level to 1.0 volt. The pull-in range should be at least 480KC ± 2.5 KC. If the pull-in range has a total bandwidth of at least 5 KC and is unsymetrical about 480KC, adjust the oscillator trimmer C15 to obtain symetry about 480KC.

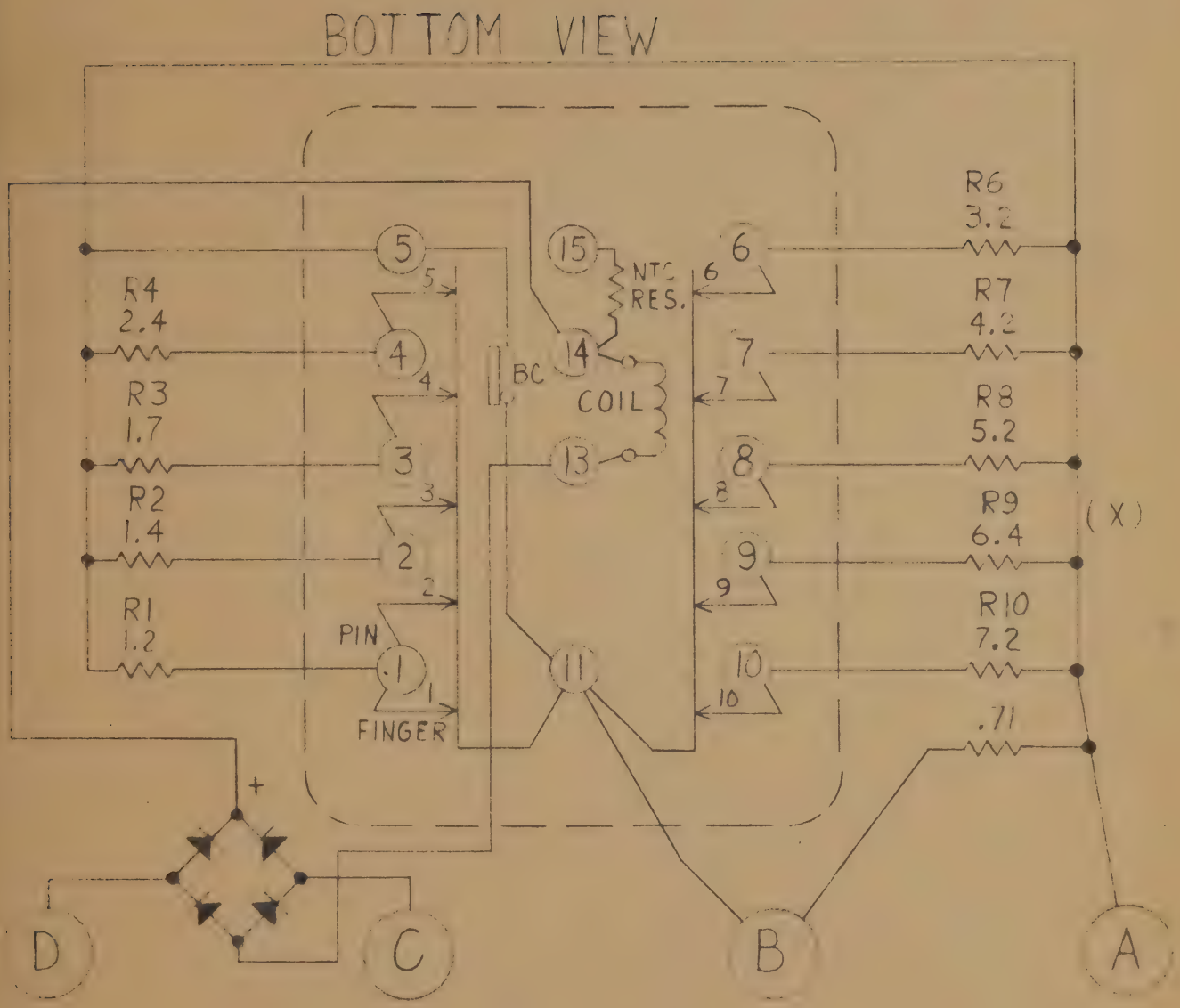
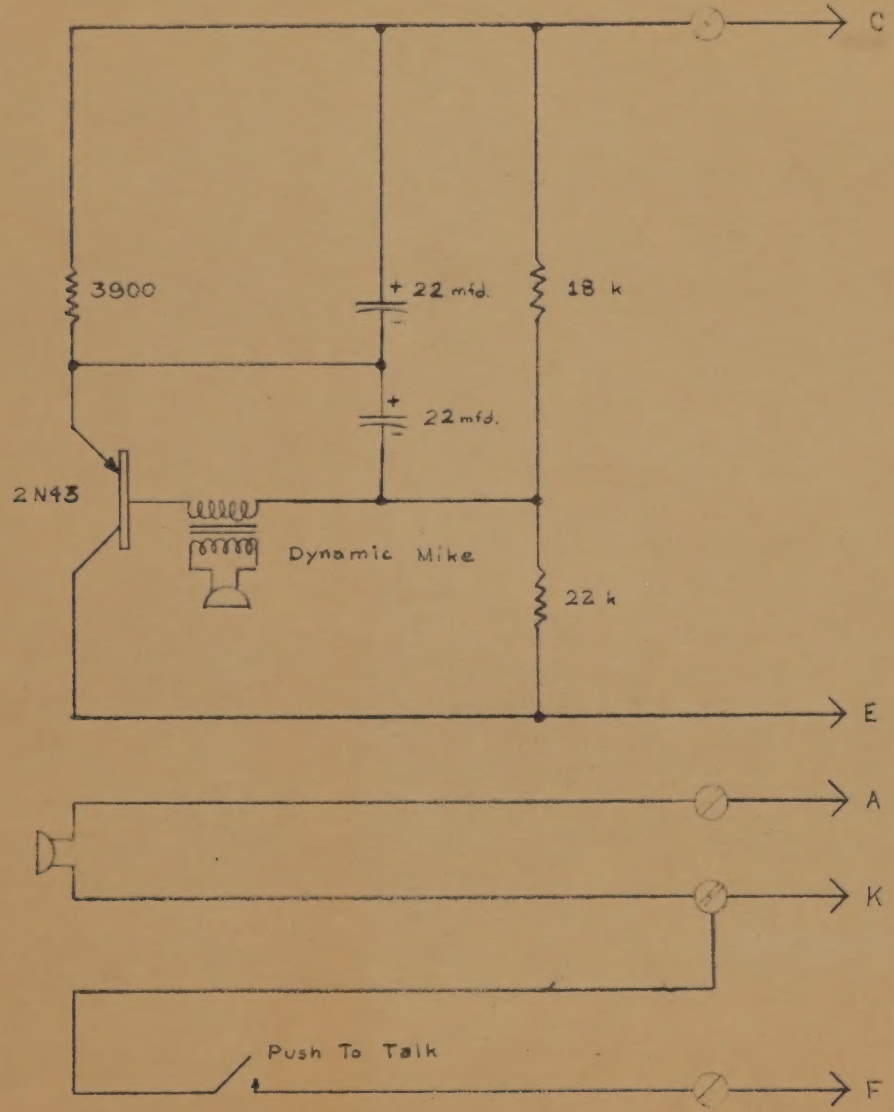
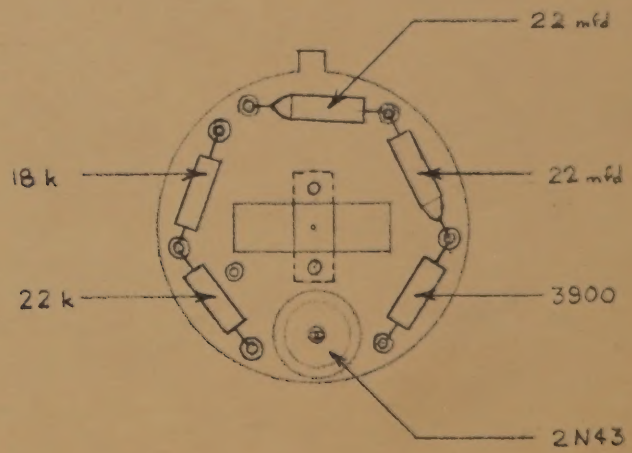


FIGURE 4.16. REGOHM SCHEMATIC





TRANSISTORIZED PRE-AMPLIFIER
For Electrovoice Model 625 SKK

FIGURE 4.17